RAILROAD GAZETTE

FRIDAY, JAN. 24.

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Contributions.

Locomotive Wheel Bases.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I take pleasure in sending the following list of rigid wheel bases of locomotives, as desired by a correspondent in your issue of Dec. 27:

American type, Old Colony Railroad, rigid wheel base 9 ft., *Railroad Gazette*, Feb. 25, 1887.

American type, New York, Chicago & St. Louis, rigid wheel base 9 ft., *Railroad Gazette*, June 29, 1888.

American type, Chicago, St. Paul & Kansas City, *Railroad Gazette*, Oct. 11, 1889, 9 ft. 1 in.

Ten-wheel locomotive, Chicago, Milwaukee & St. Paul, *Railroad Gazette*, Oct. 25, 1889.

Mogul locomotive, Elmira, Cortlandt & Northern R. R., 9 ft. 7 in.

English compound, Pennsylvania Railroad, 9 ft. 8 in., no side rods.

Goods locomotive, Great Northern Railway, England, six-wheel type, spread of rear drivers, 9 ft. 2 in.

Four-coupled tank engine, Dutch State Railways, rigid wheel base, 9 ft. 10 in.

C.

Suburban Engines.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I want to say a word to you about suburban engines—a subject which I notice you have discussed at some length in your notice of the new Burlington engine. What I want to say is that, while I believe the Forney is the best type now in use in this country, it seems to me the English are far ahead of us. What we need is the type of engine almost universally used there for such work. The general type is that of our regular eight-wheeled American engine with a Forney cab, which in some cases overhangs to such an amount as to necessitate a small pair of trailing wheels. The tank is generally on either side of the boiler, extending forward from the cab. A handsome engine of this type was illustrated in *Engineering*, Aug. 2, 1889, p. 150, as used on the Taffvale Railroad.

Those of your readers who have been abroad will need no further description. If I remember my figures correctly, Mr. Stroudley, on the South Coast, runs his light engines of this type—say 30 or 40 tons—on 26 lbs. of coal to the mile. I know they are used in regular service in England for upward of 50 mile runs. I cannot see why such engines do not possess all the advantages of Forney's for any but elevated roads, and in addition having several things in their favor. 1. The arrangement of running parts is such that it can be interchanged with the eight-wheel road engines. 2. Unless of large size they do not require more wheels, and as Forneys run drivers ahead with such success, certainly these could and do. 3. In England they are found to be the most economical engine for 40 and 50 mile runs. I believe no Forney now in use runs much over 20.

I have been interested in some Forneys which the Rhode Island Works have just turned out for a road which is owned by a few of us here. They are for the Los Angeles, Pasadena & Glendale. They are in general design similar to those on the Providence division of the Old Colony, but not quite as heavy, as the order was a small one. I consented to use the Forney idea, but I am anxious to see some large road try what seems to me is bound to be more than an experiment, the type of engine in use in England.

G. B.

Flangeless Driving Wheels.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Please inform me whether in those ten-wheeled locomotives in which a rigid centre truck is used the flanges of the main drivers take any part in steering the locomotive on curves? If they do, is it accomplished by allowing end-play to their journals as in the rear drivers of decapods? And if no such assistance is rendered, why cannot these tires as well as the front ones be left blank? The ordinates of sharp curves are certainly as favorable as in blind tired eight-wheeled locomotives.

G. R. C.

[Our correspondent, as we understand it, wishes to know if the flanges of the main drivers on ten-wheel locomotives, having rigid centre trucks at front, are depended upon to assist in guiding the locomotive around curves. No, because the guiding power of a rigid centre truck located at the extremity of a locomotive is so far superior that any assistance rendered by the flanges of the main drivers would be extremely small. Ten-wheel locomotives have been built with regard to flanges and guiding trucks in four different ways, as follows: Rigid centre trucks with blank tires on front or main drivers, and swing centre trucks with blank tires on front or main drivers. Some other combinations have been made, but they are seldom used. Occasionally more play is given to the back drivers, or the main drivers, than to the front. In answer to the question "why the main and front tires cannot be left blank when the front truck has a rigid centre?" one must say that, as far as guiding the locomotive around curves is concerned, there is no reason, but it is not safe to construct a locomotive in this way depending upon the truck entirely for safety. When there are flanges on two pairs of drivers, and anything happens to the front truck, there will be a great probability of the locomotive staying on the track, and when the truck is entirely removed the locomotive would pass safely along for a considerable distance. If, however, there be no flanges on the front or middle drivers of a ten-wheel engine, and an accident should happen to the front truck, the locomotive, having nothing to guide it, could slew around in any direction. Many eight-wheel locomotives have been constructed with rigid centre trucks and blank tires on the front drivers, but such locomotives are open to the objections mentioned, and are therefore not much used. They are, however, very easy upon curves. Practically much of the benefit of flanges and much of the inconvenience of blank tires is found in yard work where sharp curves are common, but where low speeds often allow the engine to press hard against the inner rail. In such a case the flange will often prevent derailment and yet not strain the rods or pins.—EDITOR RAILROAD GAZETTE.]

The New Hall Signal.

Many railroad men are doubtless familiar with the name of the Hall automatic electric signal. They will recollect that it was extensively advertised for several years in the columns of the *Railroad Gazette*, and that it has long been in practical service on a number of railroads in the East. The original inventor, Thomas S. Hall, was, in the opinion of Judge Shipman of the United States Circuit Court, "the father of the plan of electrical railroad signaling apparatus now in use in this country," and was in fact the pioneer in this line of railroad appliances.

His system as originally devised was operated on an *open* electric circuit, and in order to provide for a possible failure of the current to operate the signal, he used two signal instruments to each block, designated, respectively, the "danger" and "safety" signals. The first signal being normally at safety and the second normally at danger, a failure of the first signal to move from safety to danger, upon the entrance of a train into the section, resulted in stopping the train at the second or safety signal, thus indicating the derangement of the apparatus or the absence of the electric current. This system proved in practice to be valuable and trustworthy, but owing to its complicated parts, great cost and delicate adjustments, and consequent liability to derangement, it has now been superseded.

The new Hall system, invented by Mr. A. W. Hall, son of T. S. Hall, is operated by a closed circuit. When no train is in the block section the signal is held at "safety" by the current, and any derangement of the latter allows the disc to automatically move to the danger position. The record of its performance upon the Boston & Albany is certainly remarkable. Going into service May 30, 1888, and being used as a positive block signal, it has never got out of order, caused an unnecessary stop, or shown safety when danger existed, thus making a perfect mechanical record. In consequence of its satisfactory operation, the Boston & Albany is now extending the system, and will soon have the entire line from Riverside to Worcester, 33 miles, double track, equipped with this system, the sections being overlapped.

The New York, New Haven & Hartford uses the system even more extensively than the Boston & Albany, and now employs in regular block service 74 signals, protecting all station yards (also the bridge over the Connecticut River, at Windsor Locks), dangerous points and switches on the main line between New Haven and Springfield, 62 miles. This road has 61 Hall highway crossing, station and drawbridge bells in use at various points on the New York, Hartford and Shore Line divisions.

A detailed description of this signal would be comparatively valueless without drawings. As these are not now available, a general description is given as follows:

The system consists essentially of an automatic electric block signal. This signal, inclosed within a suitable case, may be placed at a given point on the line of a railroad. An electric current, flowing through a wire strung on poles and to the magnets of a signal instrument of the most simple description, holds the red signal at safety, or "all clear." A train in passing this signal causes it to drop or turn to danger, this change being effected by the wheels of the train coming in contact with a suitable circuit breaker placed in proximity to the rail. After protecting itself in this manner the train passes on one mile, more or less, places another signal at danger, and after passing quite a distance beyond the second signal a circuit closer is operated by the train, which in turn causes the first signal to change from "danger" to "safety," thus opening the first block to a following train. In addition to the protection afforded against collision, each switch is connected and interlocked with the block signals, so that in case of their misplacement the signal goes to danger.

Bells to automatically announce the approach of trains at highway crossings, stations, drawbridges and switch houses, are also provided for in the Hall system, and the company also makes a very complete and efficient system of electric interlocking signals for railroad grade crossings and junctions.

The company has made a new departure in its business policy which is interesting, and may become very important. That is, it offers to put in its apparatus and maintain it on a lease basis, under proper guarantees of efficient service. The railroad companies will be at no expense for equipment and repairs, but merely pay an annual rental.

There are now on exhibition in New York City a full-size line signal and track instruments, showing the operation of the apparatus very clearly. Those who wish to inspect it can do so by communicating with the Hall Co. at its office, 50 Broadway, New York City.

Suburban Railroad Traffic.

BY W. H. BOOTH.

As very truly stated in the *Railroad Gazette* of Dec. 13, the requirements of suburban traffic have not met with that attention from railroad managers which ought to be given to so important a branch of the service. As towns increase in size the necessity for good suburban train service also increases, and so far as I have been able to judge this fact has not obtained that recognition in America which is accorded it on this side. The English railroad system was developed very rapidly, and to this fact we owe it that tunnels, under bridges, etc., were all constructed of much smaller dimensions than would have been the case had the future of railroads been more plainly appreciated. As a consequence of this the carriages are less in width than American cars and also less in height, especially the latter because of the use of larger wheels than customary in America. Local traffic is thus carried on in carriages not much dissimilar from the carriages of main line traffic so far as regards width and height; though it is not usual except on one small line in the North, worked by a joint committee, to find long 12-wheeled cars on merely local service.

Now in America, from the neglect to pay special attention to local traffic, this is carried on in cars of the same build as the main line traffic, though the necessity for this is not, as regards cross section of cars, so apparent as it is here. Naturally for a main line traffic involving journeys of many hundreds of miles, or even thousands, the cars require special construction, but for a short run of 20 minutes the same requirements cannot be demanded or felt necessary, and something altogether lighter in build and smaller in size would undoubtedly be found to serve local traffic better than main line cars.

I am fully aware that Americans will take a deal of persuading before they will give up end doors to cars. The English are usually considered conservative in their adherence to their old notions and hard to change to new ideas, and yet Americans are very much the same. Against the end doors for long journeys I have no word of complaint apart from their danger in times of accident, when they are apt to convert a car into a locked oven; but some month's experience of the New York elevated lines has convinced me that for local traffic the end door system is quite inadequate. I have seen it stated that the trains on the elevated do not stop longer at stations than do the trains of the London district. Whether this be the case or not, it is true that the side door system enables a passenger to get away from the train very much more quickly and without the necessity of standing up and struggling for the door one or two stations before the point of alighting.

Where a train draws up with a platform on one side only, it is true there is some delay, the ingoing passengers waiting to step in until the outcomers get down. In the end-door system passengers are supposed to cir-

culate, in at one door and out at the other end; but painful experience teaches us such is not always done by any means, and even if fully carried out, the number of passengers leaving a long car by one end door must be, and often is, considerable, while in an equal length of train here there would be perhaps eight doors, of which, allowing for waiting, four may be said to be affording outlet and four allowing inlet for the *whole* period of stoppage. Again, some of the busiest stations here, such as Finsbury Park and Chalk Farm, are arranged so that trains

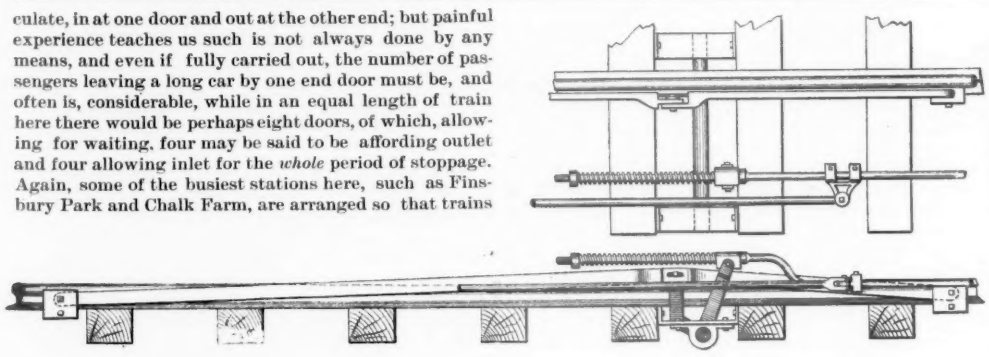


Fig. 1.

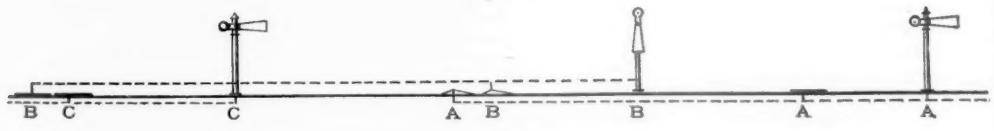


Fig. 3.

BLACK'S AUTOMATIC BLOCK SIGNAL.

come in on a single track, *i. e.*, with a platform on each side, and have then quite eightfold the working speed per unit length of train of a long end-door car. The use of central doors on the Brooklyn Bridge is a concession to the truth of this. Now it seems very clear that, suburban traffic being so undeveloped in America, there ought to be some foresight exercised in preparing for it, for it will before long assume large proportions. It would be a very simple matter at the outset to scheme out stations, especially where traffic is large, in such a manner that trains should take up all their passengers from, say, the left side and deliver on the right. East and west-bound trains, for example, would pick up the former from a north, the latter from a south platform, and would set down on an island platform, common to both tracks, or *vice versa*, whichever might be found the more convenient. Side doors, of course, would be used, and locomotives of the type illustrated Dec. 13, but probably smaller, say with four wheels coupled, with four-wheel trucks and side tanks.

Reasonable speed and rapid accelerating power are essential, but very high speeds become impossible when local traffic becomes very heavy, owing to the number of trains using the line.

As an illustration of what a local service of trains may grow to, take the place whence I now write, Willesden Junction. From this station during 18 hours out of the 24 one may go east into the city by 107 trains daily, some of which run through in 21 minutes, others stopping by the way at some or all of the 17 stations in North London, according to which of two routes be taken. The trains which stop at all of the 13 intermediate stations on one route take 36 minutes to run about 8 miles. Thirty-one trains run to the city round by the west of the city and along the river east. There are stopping trains taking 45 minutes to run to the city to a point—the Mansion House station—about 10 minutes' walk from Broad street station, which is the point of arrival of the 107 trains before mentioned. The west route is not used by business men, but is a purely pick-up service, many of the trains simply going from Broad street to Mansion House and back again.

Fifty-nine daily trains leave for Euston station, a distance of five miles, many of them through trains, taking 12 minutes on the journey, some doing it in 10 minutes, and the stopping trains which call at four intermediate stations take 16 to 18 minutes. In addition to these trains about 73 others run to stations in the west and south of London, as to Waterloo, Victoria, Richmond, Kew, etc., and all these 270 trains are represented by an equal, or nearly equal, number of return trains. Of this number of trains only about 180 may be classed as belonging to such a category as, say, a service of trains from Newark to Courtlandt street, or Yonkers to Park Place, purely for convenience of suburban residents.

As an illustration of the immense importance of local traffic, the Great Eastern Railway of England may be cited. This line serves one of the most thinly populated parts of England, including the counties of Suffolk, Essex, Norfolk and Cambridge; but it has a London terminus at Liverpool street, and serves that portion of London as regards suburban traffic which lies in Essex and East Middlesex. Now the Great Eastern line carries more passengers annually than any other English line, and this is due to suburban and local traffic, not to its main line and country traffic, though one-horse places of which it was once written—

"Where none but a G. E. train deigns to stop,
Where there's no one to pick up and no one to drop."

The Great Eastern, moreover, has not a monopoly either of East London traffic.

Now, in taking Willesden as an example of a suburban centre, I have only selected one of many similar centres through which large numbers of trains pass daily. Every railroad running into London seems to have a similar outside junction.

The commutation principle of granting tickets for so many days, at two journeys per day, does not appear calculated to promote a suburban residential population The universal practice on this side is to grant passes for three, six or twelve months, or even shorter periods in some cases, which allow any number of journeys per day; thus affording a means of going into the city in an evening without cost, which cannot be done on the American plan, and hence suburban residence is promoted. The railroad gains by the liberality, for it promotes suburban traffic, and it really costs nothing to carry a passenger, although it is costly to run trains. The railroad carries the evening passenger to his lecture or theatre for nothing; but gains the yearly $50 or $60 which he pays for his regular day's trip. The 1,000-mile

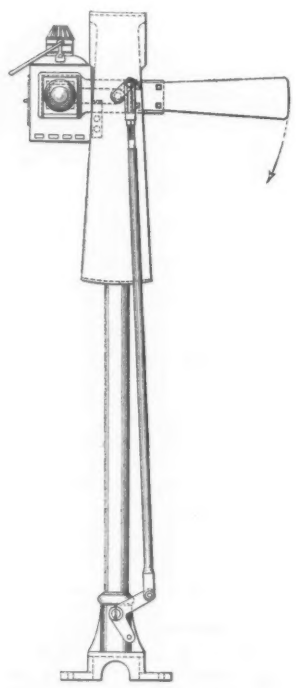


Fig. 2.

ticket, too, introduces complexity which would never work on a crowded line.*

Black's Automatic Block Signal.

This apparatus, which has been in use for two or three years on the elevated roads of New York, and elsewhere, is simple and strong in construction and has been found very efficient in operation. The essential parts are shown in the illustrations herewith.

Fig. 1 shows a plan and side elevation of the track instrument. This consists of a lever placed just outside of the rail, which is depressed by the tread of the wheel passing over it. This operates a rocking shaft which is connected with the ground connection leading to the signal. As will be seen, this connection from the rocking shaft to the ground connection is made by means of a rod having on one end of it a strong spiral spring, the object of which is to prevent severe shocks to the various parts.

Fig. 2 shows the standard form of semaphore signal as used with this system on the Manhattan Elevated. The post, which is of iron, supports a cast-iron shield, behind which the blade is hidden when in the "all clear" position. This shield is painted black, so that safety is indicated by the *absence* of the arm rather than by its perpendicular position. The motion plate by which motion is transmitted from the line of ground connections to the bell crank at the foot of the signal posts is shown in fig. 4. It will be seen that this motion plate provides for a certain amount of change in the length of the connections from expansion and contraction, or slack. By the use of this device the labor and care necessary to keep the rods adjusted has been reduced to a minimum. On the Manhattan one man attends to the inspection of 54 signals.

Fig. 3 is a diagram, not made to scale, showing in a general way the operation of the apparatus. *AA* are levers operating the connection to signal *A*. A train moving from right to left has passed the signal and has set it to danger by means of the track instrument, *A*, near the signal. When the engine arrives at the first lever beyond signal *B* it sets signal *B* to danger and immediately after, at the lever marked *A*, sets signal *A* at clear. This is repeated throughout the system.

The length of the blocks on the New York Elevated through which this system has been operated is about 1,700 ft. At the regular speed of trains on the Manhattan this distance is traversed in about 47 seconds, which is as close together as trains can be run in ordinary service this amount of time being generally required at the terminal stations to detach the engine and attach a fresh one at the other end of the train. Discharging the passengers and taking in the new load also requires nearly a minute, although it is often done more quickly than that.

The trains on the Manhattan lines where this signal is used are of nearly uniform length; the invariable maximum is five cars and an engine. Four-car trains are run a good deal, and empty engines make occasional trips, but the variation is immaterial from a signaling standpoint. The signals and track instruments are therefore made to accommodate the five car trains. The engine sets each signal to danger when the rear car has passed 25 ft. beyond the signal and restores that signal to "all clear" when the rear car has passed the next one; each is therefore a home signal. No permissive blocking is allowed, but every engineman must be prepared to stop *at* the signal.

This apparatus is the invention of Mr. Robert Black, Roadmaster, who has been connected with the roadway department of the New York elevated roads since they were first built. The signals are now made by the Black Automatic Railway Block Signal Co., of 192 Broadway,

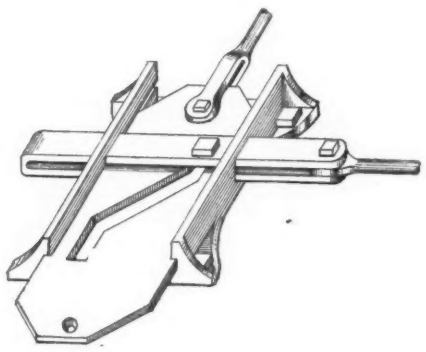


Fig. 4.

New York City. They are in more or less use on the Staten Island Rapid Transit road, the Kings County Elevated and the Brooklyn Bridge. The Manhattan has a series of 32 continuous block sections in operation on the Sixth avenue line above Fifty-ninth street.

*The plan now in use on some roads out of New York is to sell a ticket giving 60 rides a month, 30 each way, which may be taken any time in the month. The rides saved on non-working days are thus available for extra evening trips, and the plan is very satisfactory to commuters.—EDITOR.

Sliding Switch and Pivoted Frog.

There are in experimental use on the Brooklyn Bridge a sliding switch and a modification of the Parsons frog which, although they have been used but a few weeks, have given such satisfaction, and are so simple, that it seems worth while to bring them to the attention of our readers. Fig. 1 is a plan of the switch and pivoted frog. It will be seen that both ends of the four sliding rails and the end of the pivoted rail in the frog are all moved simultaneously by the stroke of one lever. In the rod which is pushed or pulled by the hand lever are inserted three racks, which engage in three pinions, and the stroke of the lever causes these pinions to make half a revolution. Thus the switch rails are carried laterally to the position required, and the frog rail is turned on its pivot to the corresponding position. In fig. 2 are given a plan and a section of the moving rail of the frog, and of the rack and pinion gear which moves it. Fig. 3 is an elevation of the case of this gear and an inverted plan of the cover plate. Fig. 4 is a side elevation and a section of part of the frog. From all of these the simple construction is quite apparent. The scale of fig. 1 is about $\frac{1}{2}$ and of the other three figures about $\frac{1}{6}$. These scales are not quite accurate, owing to an error in the

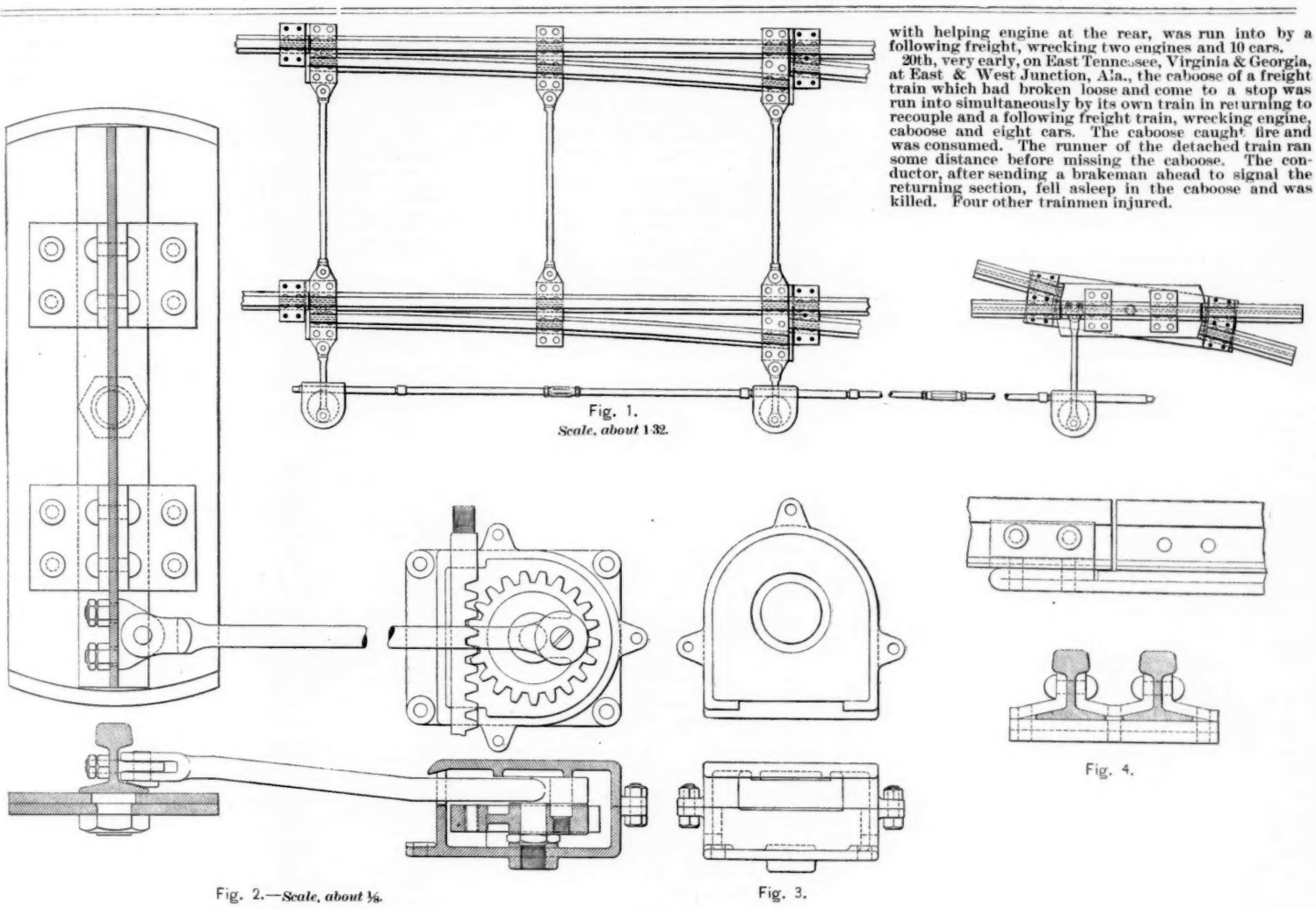


Fig. 1.
Scale, about 1-32.

Fig. 2.—*Scale, about ½.*

Fig. 3.

Fig. 4.

SLIDING SWITCH AND PARSONS' FROG—NEW YORK & BROOKLYN BRIDGE RAILROAD.

photographic reduction of the drawings, but are near enough for the purposes of the illustration. As the pinions make half a revolution for each movement they stand on the dead centres at either end of the stroke, and, therefore, the switch and frog rail are locked in either one of their extreme positions.

The Parsons frog was shown in our issue of Aug. 16, 1889. As there shown the rail was pivoted near the end instead of in the middle as in the form shown here, and it was actuated by a worm gear. In either case the same end is accomplished, that of making a frog with a continuous rail, and thus avoiding the shocks which rolling stock must necessarily receive in passing over solid frogs of the ordinary pattern.

Train Accidents in December.

COLLISIONS.

REAR.

1st, on Pennsylvania, near Kittanning Point, Pa., a freight train broke into three parts and the two rear portions collided, wrecking six cars, one of which caught fire and was burned.

2d, on Delaware, Lackawanna & Western, at Rochester & Pittsburgh Junction, N. Y., a passenger train struck the rear car of a switching freight which fouled the main track from a siding, and on which no signal lights were displayed. The freight car was wrecked and the engine and several cars of the passenger train were damaged.

4th, on Kansas City, Memphis & Birmingham, at Holly Springs, Miss., a freight train descending a grade broke in two and the detached portions collided, derailing two cars.

4th, on Kansas City, Memphis & Birmingham, at Holly Springs, Miss., a freight train ran into the rear of a disabled freight standing at the foot of a grade, doing considerable damage.

5th, on Pennsylvania, at Huntingdon, Pa., a passenger train ran into the rear of a freight, wrecking engine, caboose, and an express car. A flagman failed to signal the passenger train.

5th, on Maine Central, near Stroudwater, Me., freight train ran into rear of another freight, wrecking engine and five cars.

5th, on Philadelphia & Reading, near Auburn, Pa., a freight train ran into the rear of a preceding freight, making a bad wreck. Four trainmen injured.

5th, on Chicago, St. Paul & Kansas City, at Durango, Ia., freight train ran over a misplaced switch, and into the rear of a freight standing on a siding, doing some damage. Two trainmen killed.

6th, on Central Vermont, near Roxbury, Vt., a passenger train ran into the rear of a freight, doing slight damage. Two trainmen injured.

6th, on Missouri Pacific, in Kansas City, Mo., a freight ascending a grade broke in two, and the rear portion ran back and collided with a following freight, wrecking the front end of the engine and derailing several cars.

6th, night, on Lake Shore & Michigan Southern, at Dune Park, Ind., a passenger train traveling rapidly ran over a misplaced switch and collided with a freight train standing on a siding. The engine was derailed and ditched, and several cars were derailed. One trainman killed, two injured. The switch lamp was not lighted.

7th, on Louisville & Nashville, near Bowling Green, Ky., an accommodation train, which was brought to a stop at the foot of a grade owing to the engine breaking a connecting rod, was run into by a following freight train, which could not be stopped, though a flagman at once went back to give warning. The two rear coaches were wrecked, and, together with the combustible portion of the colliding engine, burned. One trainman injured.

7th, on Lehigh Valley, in a tunnel at Pattenburg, N. J., a construction train collided with some freight cars, wrecking engine and four cars. A laborer was killed and several others were injured.

9th, on Pennsylvania road, near Lucknow, Pa., freight train ran into the rear of another freight during a dense fog, damaging engine and several cars and derailing a number of others.

10th, on Cornwall & Lebanon, near Colebrook, Pa., passenger train ran into the rear of a freight train, disabling a locomotive and derailing a number of freight cars.

11th, on Louisville, St. Louis & Texas, near Baton Rouge, La., a passenger train struck the rear portion of a freight projecting over the main track from a siding, disabling the engine and wrecking the caboose and two cars. The wrecked cars took fire and were burned.

11th, on Philadelphia & Reading, near Sunbury, Pa., freight train ran into the rear of another freight, damaging engines and several cars. Engineer and fireman injured.

11th, on Gulf, Colorado & Santa Fe, near Alvin, Tex., passenger train ran into the rear of a freight train, wrecking the caboose and damaging the engine.

13th, on Northern Central, at Railroad Borough, Pa., a freight train with a pusher at the rear end was run into by a following freight, wrecking both engines and five cars.

14th, on Chicago, Burlington & Quincy, at Wedron station, Ill., freight train ran into the rear of a preceding freight, wrecking locomotive, caboose and several cars. Fire broke out and the wrecked cars and an adjacent grain warehouse were destroyed.

14th, on Pittsburgh, Fort Wayne & Chicago, at Pittsburgh, Pa., engine going to a roundhouse ran over a misplaced switch and into some freight cars standing on a siding, doing considerable damage. A passenger train also ran over the misplaced switch, adding to the wreck. One trainman injured by jumping.

16th, on Chicago & Northwestern, near Elmhurst, Ill., freight train broke in two and the detached portions collided, wrecking a number of cars.

16th, on New York, Lake Erie & Western, near Almond, N. Y., freight train broke in two and the two portions collided, damaging several cars.

17th, on Central of New Jersey, at Bergen Point, N. J., freight train ran into the rear of another freight backing on to the main track. Engine and four cars wrecked. Two trainmen injured.

18th, on Denver & Rio Grande, near Walsenburg, Col., a heavy freight train, with two engines at the front, broke into three parts while descending a steep grade and the detached portions afterward collided, piling up both engines and nearly all the cars in a very bad wreck, killing many cattle. Two trainmen killed, one injured.

18th, on New York & New England, at Forestville, Conn., freight train broke in two and the detached portions afterward collided, doing some damage. Brakeman injured.

18th, on Baltimore & Ohio, at Calverton, Md., a freight train ran into the rear of a preceding freight, wrecking an engine and seven cars. Engineer injured.

19th, on Lehigh Valley, at Tannery, Pa., a freight train, with helping engine at the rear, was run into by a following freight, wrecking two engines and 10 cars.

20th, very early, on East Tennessee, Virginia & Georgia, at East & West Junction, Ala., the caboose of a freight train which had broken loose and come to a stop was run into simultaneously by its own train in returning to recouple and a following freight train, wrecking engine, caboose and eight cars. The caboose caught fire and was consumed. The runner of the detached train ran some distance before missing the caboose. The conductor, after sending a brakeman ahead to signal the returning section, fell asleep in the caboose and was killed. Four other trainmen injured.

20th, on Camden & Atlantic, at Berlin, N. J., an empty engine ran into a box car which had been blown out of a siding on to the main track in a gale, disabling the engine. Fireman injured by jumping.

20th, on Northern Central, near New Freedom, Pa., freight ran into the rear of a preceding freight, disabling the engine and damaging caboose and three cars. Fireman injured by jumping.

20th, on Northern Central, at Conewago, Pa., a freight train was run into at the rear by a switching engine. Engine, caboose and car damaged.

20th, on New York, Lake Erie & Western, at Garfield, N. J., freight train standing at a water tank was run into at the rear by another freight, damaging locomotive and caboose, and derailing several cars. Trainman injured. There was a dense fog at the time.

20th, on Pennsylvania, at Frankford Junction, Pa., freight train standing at a water tank was run into by a following freight, damaging the caboose. A dense fog prevailed at the time.

20th, on Savannah, Florida & Western, near Screven, Ga., freight train ran into the rear of a preceding freight, damaging engine and three cars.

20th, on East Tennessee, Virginia & Georgia, near Jacksonville, Ala., a freight train broke in two and the rear portion was run into by a closely following freight, wrecking engine and nine cars. One trainman killed, two injured.

20th, on Burlington & Missouri River, at Sutton, Neb., a westbound freight standing at a water tank was run into at the rear by a fast freight train, piling up engine and 10 cars in a bad wreck, and damaging the station building. One trainman injured.

21st, on Duluth, South Shore & Atlantic, near Saxon, Wis., freight train ran into the rear of another freight, wrecking engine, caboose and 3 cars. One trainman killed, two injured.

21st, on Pittsburgh, Fort Wayne & Chicago, near Lima, O., a freight train broke in two and the rear portion collided with a following freight. Engine, caboose and 16 cars wrecked. Three trainmen in the caboose were injured.

21st, on East Tennessee, Virginia & Georgia, near Fullen's, Tenn., three freight trains, bound in the same direction, collided, the forward one having broken in two, wrecking two engines and derailing 18 cars. Engineer injured.

21st, on Lehigh Valley, at Laury's, Pa., an eastbound express train running at speed dashed into the rear end of a freight train entering a siding. Passenger engine and a number of freight cars were badly wrecked. One trainman killed, one injured.

22d, on Philadelphia & Reading, at Reed's Station, Pa., a standing construction train was run into by a freight, and a car containing a number of laborers was derailed and thrown over an embankment One laborer killed and three injured. The flagman sent out by the construction train failed to go far enough.

24th, on Housatonic road, near New Haven, Conn., a passenger train was run into at the rear by a construction train, doing some damage, and injuring several passengers.

25th, on Lake Erie & Western, near Glynwood, Ind., freight train ran into the rear of another freight, wrecking two engines and 13 cars.

25th, on Chicago, St. Paul, Minneapolis & Omaha, at St. Paul, Minn., a freight train ran into the rear of another freight, damaging the engine and three cars and derailing a number of others.

25th, on Pennsylvania, at Fish House Station, N. J.

freight train ran into the rear of preceding freight, doing slight damage.

26th, on East Tennessee, Virginia & Georgia, at East Rome, Ga., freight train collided with some cars standing on the main track, disabling the engine and smashing several cars loaded with lumber. Brakeman injured.

27th, on Pennsylvania, at McGarvey's, Pa., a freight train descending a steep grade became uncontrollable and ran into three empty engines ahead of it, which in turn were forced into the rear end of a preceding freight train. Four engines disabled, several cars wrecked and burned, fireman killed.

27th, on Pittsburgh, Cincinnati & St. Louis, near Pittsburgh, Pa., an express train was run into by a following passenger train, damaging the rear (sleeping) car of the foremost train.

30th, on Georgia Pacific, near Davisville, Ala., a freight train ascending a grade broke in two and the rear portion ran back and collided with a following freight, damaging engine and wrecking caboose and one car. The caboose took fire and, together with a coal car, was burned. Two trainmen injured.

BUTTING.

2d, on New York, Lake Erie & Western, at Blood's Station, N. Y., butting collision between two freights, wrecking the engines and a number of cars.

2d, on Pennsylvania road, at South Pennsylvania Junction, Pa., a passenger train ran over a misplaced switch and crashed into the head of a freight standing on a siding. Both engines, two baggage and several freight cars wrecked, the engines being overturned. Four trainmen injured.

2d, on Pittsburgh, Fort Wayne & Chicago, in Chicago, Ill., butting collision between two Chicago, Milwaukee & St. Paul freight trains, doing considerable damage and killing 15 head of cattle. Two trainmen injured by jumping.

5th, on Pennsylvania, near Greensburg, Pa., a passenger train ran over a misplaced switch and into the head of a freight standing on a siding. The engines and several cars in each train were badly damaged. Five trainmen and three passengers injured.

6th, on Chicago, St. Paul & Kansas City, at Durango, Ia., butting collision between two freight trains. Engines and 10 cars wrecked. Two trainmen killed. It is stated that the collision was due to a flagman's negligence.

7th, on Chicago, St. Paul & Kansas City, near Dubuque, Ia., butting collision between two freights, wrecking both engines and 20 cars.

7th, on Richmond & Danville, near Anderson, S. C., butting collision between an empty engine and a freight car, derailing the tender. The engineer had reversed and got off the engine, which ran four miles, dragging the tender on the ties.

10th, on East Tennessee, Virginia & Georgia, at Macon, Ga., butting collision between two switching engines in a dense fog.

10th, night, on Northern Central, near Emigsville, Pa., butting collision between two heavy freight trains, piling up both locomotives and 29 cars in a very bad wreck. Two trainmen killed, two injured.

10th, on Vandalia Line, at Dooley's, Ind., butting collision between a freight train and a construction train, wrecking the engine and several cars of both. One trainman killed and another injured.

13th, on Baltimore & Ohio, near Wolf Summit, W. Va., butting collision between two freight trains, doing considerable damage.

15th, on Chicago, Burlington & Quincy, near Burlington, Ia., butting collision between two freight trains, wrecking both engines and six cars. One of the engineers disregarded a signal.

16th, on Chicago & Eastern Illinois, at Oakdale, Ill., butting collision between passenger train and switching freight train, damaging both locomotives. Two trainmen injured.

16th, on Ohio River road, near Moundsville, W. Va., collision between passenger train and the detached locomotive of a freight bound for a water tank. Both engines damaged.

17th, on Southern Pacific, at Scott, La., butting collision between passenger trains, said to be owing to a defective working of the air brakes on one of them. Engine and several cars in each train damaged. Three trainman injured.

17th, on Cleveland, Cincinnati, Chicago & St. Louis, at McCoy's Station, Ind., an eastbound express train ran into the head of a freight train backing into a siding, disabling both engines. Conductor injured. It is said that the collision was due to a misinterpretation of orders.

18th, on Chesapeake & Ohio, near Russell, Ky., butting collision between mixed train and a freight, due to a misplaced switch, disabling both engines and damaging three cars.

18th, on East Tennessee, Virginia & Georgia, at McGriff, Ga., butting collision between two freight trains, wrecking both engines.

18th, on Central of Georgia, at Geneva, Ga., butting collision between a freight train and a construction train standing on the main track, damaging both engines. Switchman killed.

18th, on Columbus, Hocking Valley & Toledo, at Delaware, O., butting collision between two freight trains, wrecking both locomotives, five flat cars and an oil tank car. The latter exploded, badly burning a trainman.

21st, on New York Central & Hudson River, near Mott Haven, N. Y., a switching freight train ran over a misplaced switch into the locomotive of a freight standing on a siding, wrecking both engines and four cars. Two trainmen injured.

21st, on Philadelphia & Reading, near Port Carbon, Pa., butting collision between an accommodation train and a freight, wrecking the engines and several cars in each train. Two coaches were turned over on their sides. Three trainmen injured.

24th, on Georgia Pacific, at Day's Gap, Ala., passenger train ran over a misplaced switch and into the head of a freight train standing on a side track, damaging both engines and several cars in each train. A man standing near the track was killed and another injured.

25th, on Cincinnati, Hamilton & Dayton, at Morristown, Ind., butting collision between passenger and freight trains, wrecking both engines.

27th, on Pennsylvania, at Moyer, Pa., butting collision between freight train and two empty engines, wrecking taree engines and 15 cars. Six trainmen injured.

27th, on Chesapeake & Ohio, near Pemberton, Va., butting collision between passenger and freight trains, doing considerable damage. Express messenger injured. Mistaking one freight train for another is assigned as the cause of the accident.

31st, on Chicago, St. Louis & Pittsburgh, near Kokomo, Ind., butting collision between two passenger trains, damaging the engines and the mail, baggage and express cars. Two trainmen killed and four injured. One of the trains failed to examine the register at the preceding station.

CROSSING AND MISCELLANEOUS.

1st, on Philadelphia & Reading, in Philadelphia, Pa., a switching freight ran into the side of another switching freight at a cross-over. Locomotive and one car damaged.

3d, on Maine Central, at Bangor, Me., collision between two locomotives, disabling both.

4th, at the crossing in Paris, Ill., a Cleveland, Cincinnati, Chicago & St. Louis passenger train was run into by a Terre Haute & Peoria freight, damaging the rear car. Ten passengers injured.

6th, on Philadelphia & Reading, near Gordon, Pa., collision between freight and construction trains, smashing several cars.

8th, on New York, Lake Erie & Western, at Barton, N. Y., freight train ran into the side of another freight crossing the main track, wrecking a number of cars.

10th, on Baltimore & Ohio, near Carroll Switch, Md., freight train ran into the side of another freight at a cross-over, derailing engine and a number of cars. Failure to observe signals is said to have caused the accident.

16th, at Conway Junction, Mass., collision between Fitchburg and New York, New Haven & Hartford freight trains, wrecking eight cars. Two trainmen injured.

16th, on Richmond & Danville, at Atlanta, Ga., collision between a passenger train and a switching engine, doing slight damage. Two trainmen injured.

17th, at Minneapolis, Minn., collision between Northern Pacific and Eastern Minnesota freight trains.

18th, at the crossing near Birmingham, Ala.. a Georgia Pacific freight approaching the crossing was not controlled and ran into a Louisville & Nashville freight, wrecking engine and ten cars. One traiman killed, two injured.

21st, at the crossing near Hastings, Neb., collision between Burlington & Missouri River passenger train and St. Joseph & Grand Island freight, disabling both engines. It is said that owing to snow on the rails the freight could not be controlled.

24th, at the crossing at Henry Ellen, Ala., a Georgia Pacific passenger train was run into by a Columbus & Western freight, wrecking engine, baggage car and several freight cars. A trainman was killed.

24th, at St. Louis, Mo., a Wabash freight was backed into a Chicago & Alton passenger train, doing slight damage.

24th, at the crossing near Irondale, Ala., collisions between Georgia Pacific passenger and Central of Georgia freight trains, doing considerable damage. Trainman injured.

28th, at the crossing in Youngstown, O., a Pittsburgh, Youngstown & Ashtabula passenger train was run into by a Pittsburgh & Western freight. Engine, mail and baggage cars damaged. Two trainmen injured.

DERAILMENTS.

DEFECTS OF ROAD.

3d, on Lackawanna & Pittsburgh, near Bolivar, N. Y., passenger train thrown from the track by the spreading of the rails, the rear car being overturned.

5th, on Central of Georgia, at Rocky Ford, Ga., freight train broke through a bridge, 20 cars going down.

6th, on Lake Erie & Western, at Lima, O., a freight train was thrown from the track by the spreading of the rails. The engine was overturned and 10 cars loaded with hogs were wrecked.

8th, on New York, Lake Erie & Western, at Barton, N. Y., several cars of a freight train going on to a siding were derailed by a defective frog and overturned.

8th, on Chicago & West Michigan, near St. Joseph, Mich., a bridge over the Paw Paw River gave way under a freight train, seven cars going down with the structure into the river.

13th, on Boston & Maine, at Boston, Mass., a rear car of passenger train derailed near a drawbridge by a defective frog. One passenger injured.

14th, on Chicago & Atlantic, at Decatur, Ind., a bridge gave way under a freight train and nine cars went down in a wreck.

16th, on Oregen Railway & Navigation Co.'s road, near Baker City, Ore., passenger train thrown from the track by the spreading of the rails, ditching the locomotive. Three trainmen injured.

17th, on Kanawha & Ohio, near Millfield, O., freight train broke through a culvert, wrecking three cars.

17th, on Northern Pacific, near Bucoda, Wash., passenger train thrown from the track by a broken rail.

18th, on Oregon & Washington Territory, near Walla Walla, Wash., passenger train derailed at a defective switch, damaging engine, tender and baggage car. Two trainmen injured.

28th, on Chesapeake & Ohio, near White Sulphur Springs, W. Va., the mail, combination car, one coach and a sleeping car of a passenger train running at about 40 miles an hour, were thrown from the track by a broken rail, the sleeping car being overturned and the combination car and coach partially crushed. Four trainmen and six passengers killed, five passengers and three employés injured.

DEFECTS OF EQUIPMENT.

2d, on Boston & Albany, near Westfield, Mass., several cars of freight train derailed by a broken wheel.

2d, on New York, Lake Erie & Western, near Howell's, N. Y., an axle under a car of a freight train broke, and 22 cars were derailed and piled up in a bad wreck, blocking both main tracks.

4th, on Burlington & Missouri River, near Grafton, Neb., baggage car and one coach of passenger train derailed by the breaking of an axle under the former. A frightened passenger jumped from the train and was injured.

5th, on Pennsylvania, at Pittsburgh, Pa., car of switching freight derailed by a broken truck.

8th, on Fitchburg road, in Greenfield, Mass., four cars of a freight train derailed and wreckek by the dropping of a brake-beam.

15th, on Cumberland Valley, near Mechanicsburg, Pa., 12 cars of a freight train derailed and wrecked by the breaking of an axle.

16th on Ohio, Indiana & Western, near Covington, Ind., the pay car attached to a regular passenger train was derailed by the breaking of an axle, overturned and dragged some distance. The superintendent and the trainmaster of the road who were in it were killed.

16th, on New York, Lake Erie & Western, at Almond, N. Y., seven cars of a freight train derailed and ditched by the dropping of a brake-beam.

19th, on Brunswick & Western, near Enigma, Ga., car of passenger train derailed on a trestle by a broken truck and tipped off, falling 10 ft. The wrecked car took fire from an overturned stove, but the flames were soon extinguished. Eight passengers injured.

27th, on Northern Central, near York, Pa., 14 cars of freight train derailed and wrecked by the breaking of an axle.

27th, on Central of Georgia, at Echeconnee, Ga., engine and baggage car of passenger train derailed by broken tender truck.

28th, on Philadelphia & Reading, in Philadelphia, Pa., rear car of outward-bound passenger train derailed by a broken axle, overturned and dragged some distance on its side before the coupling broke, and badly damaged. Eight passengers injured. Burning coals from an overturned stove set fire to the woodwork, but the flames were soon extinguished.

NEGLIGENCE IN OPERATING.

3d, on East Tennessee, Virginia & Georgia, near Morristown, Tenn., 10 cars of a freight train were derailed and ditched at a point where track repairs were in progress.

6th, on Cornwall & Lebanon, at Lebanon, Pa., tender and three cars of switching freight derailed and badly damaged in attempting to make a flying switch. Engineer injured.

13th, on Kansas City, Memphis & Birmingham, at Birmingham, Ala., engine and one car of switching freight train derailed by a misplaced switch. One trainman injured by jumping.

13th, on Pittsburgh, Cincinnati & St. Louis, at Columbus, O., engine and three cars of freight train derailed at a misplaced switch.

13th, on Wabash, near Ferguson, Mo., a work train, with engine at the rear, ran over a hand car, derailing a flat car and tender and disabling the engine. Two trainmen killed and two employés injured.

14th, on New York, Susquehanna & Western, at Little Ferry, N. J., a coal train, consisting of engine and 23 cars, went through the open draw of a bridge over Overpeck Creek and was submerged in the stream below. Three trainmen, including the engineer, who must have disregarded the danger signal, were killed. There was a heavy snow storm at the time.

16th, on St. Louis, Iron Mountain & Southern, at Alexander, Ark., freight train derailed by a misplaced switch, the forward portion being ditched. The engine was overturned, killing the fireman.

UNFORESEEN OBSTRUCTIONS.

1st, on Central Pacific, near Delta, Cal., a freight train ran into a landslide, wrecking engine and three cars. One trainman killed, two injured.

14th, on Louisville & Nashville, at Pollard, Ala., passenger train ran over some horses, derailing engine and the baggage and postal cars, the former being upset. A tramp stealing a ride was injured.

18th, on Philadelphia & Reading, near Winfield Station, Pa., freight train ran over some cattle, the engine being derailed and thrown down an embankment.

21st, on Georgia Pacific, at Welburn's Siding, Ga., passenger train derailed at a switch which had been maliciously obstructed by a piece of wood, the locomotive being overturned.

22d, on Baltimore & Ohio, at Dickerson Station, Md., passenger train moving at speed ran over a horse. The engine went over an embankment, baggage and smoking car derailed and badly damaged. Engineer killed, fireman and several passengers injured. It is stated that the severity of the accident was mitigated by the fact that the cars were vestibuled.

UNEXPLAINED.

2d, on Gulf, Colorado & Santa Fe, near Midlothian, Tex., two cars of freight train derailed.

3d, on Philadelphia, Wilmington & Baltimore, near North East, Md., several cars of freight train derailed and wrecked.

4th, on Louisville & Nashville, at Longview, Ky., two cars of freight train derailed.

4th, on New York, Lake Erie & Western, at White Bridge, N. Y., freight train derailed and several cars wrecked.

5th, on Chesapeake & Ohio, at Newbern, Tenn., two cars of a passenger train were derailed and overturned.

7th, on Galveston, Houston & San Antonio, near Columbus, Tex., several cars of freight train derailed and wrecked.

8th, on Louisville, New Albany & Chicago, near Frankfort, Ind., rear tender truck of engine of passenger train derailed when approaching a long trestle, separating the air-brake hose. The train ran on to the trestle, where all the cars left the track, the baggage car and one coach being tipped off into the creek 15 ft. below. The trestle was badly damaged. One trainman and three passengers injured.

9th, on Philadelphia, Wilmington & Baltimore, near North East, Md., car of freight derailed.

10th, on Lackawanna & Pittsburgh, at Ceres, N. Y., two cars of a freight train derailed.

10th, on East Tennessee, Virginia & Georgia, at Macon, Ga., engine of passenger train derailed at a frog.

10th, on Grand Rapids & Indiana, at Tustin, Mich., three cars of freight train derailed and overturned in the ditch. Conductor killed.

11th, on St. Paul, Minneapolis & Manitoba, near South Shore, Dak., mixed train derailed and thrown over an embankment. Three trainmen killed and another injured.

12th, on Gulf, Colorado & Santa Fe, near McGregor, Tex., freight train derailed and several cars wrecked.

13th, on Duluth, South Shore & Atlantic near Clarksburg, Mich., car of freight train derailed.

13th, on Duluth, South Shore & Atlantic, near Marquette, Mich., engine and four cars of freight train derailed.

14th, on Lehigh Valley, at Van Ettenville, N. Y., freight train derailed.

18th, on West Shore, at Memphis, N. Y., freight train derailed and 15 cars wrecked. A boy stealing a ride was killed

18th, on Vandalia Line, at East St. Louis, Ill., engine and several cars of freight train derailed. Trainman killed.

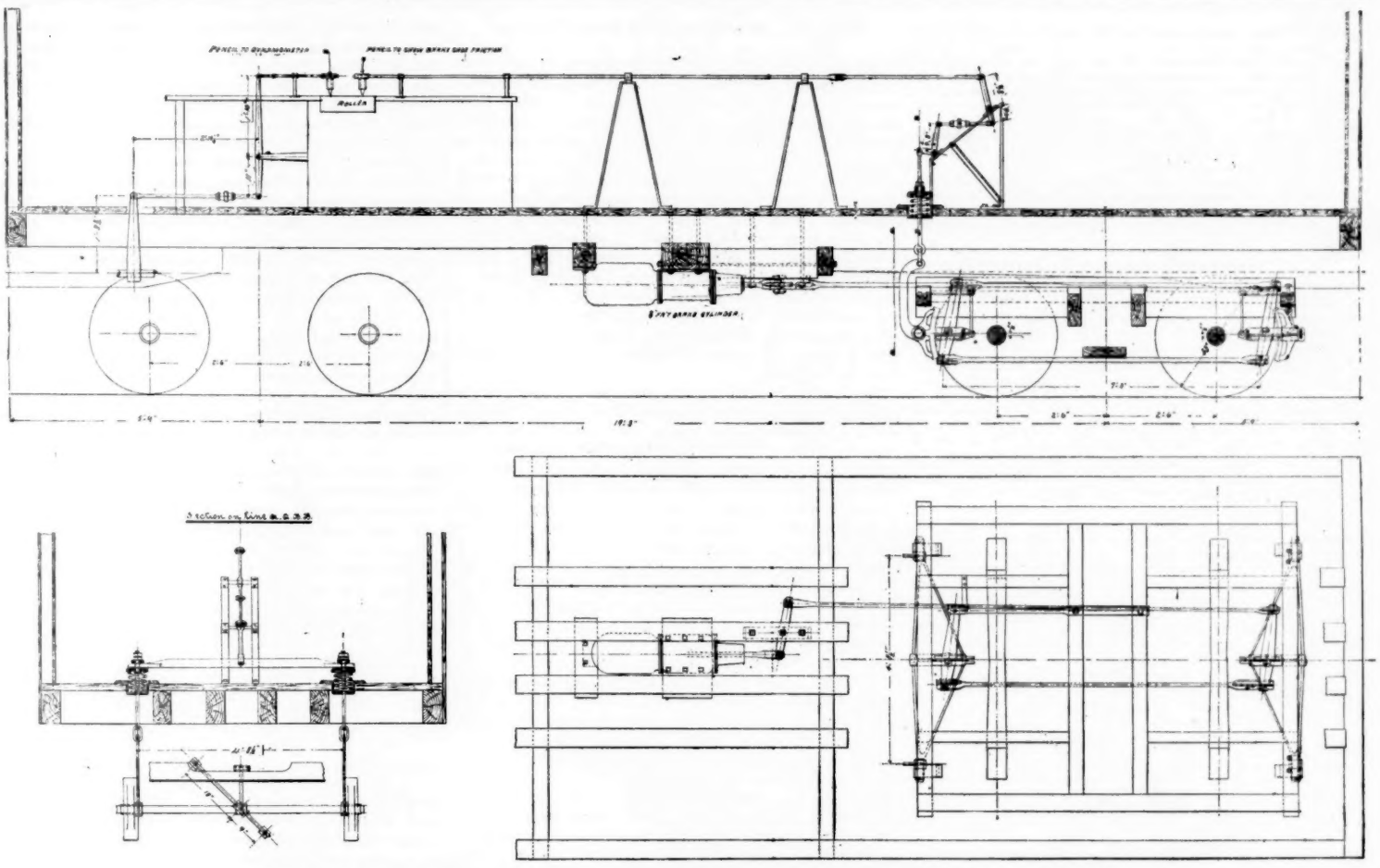
19th, on Louisville & Nashville, at Blocton Junction, Ala., rear car of passenger train entering a side track derailed. Passenger injured.

20th, on Louisville, New Orleans & Texas Pacific, near Centreville, Miss., freight train derailed, eight cars and an engine in transit being wrecked.

20th, on Louisville & Nashville, at Oak Grove, Ala., freight train derailed at a split switch, wrecking engine and five cars. Engineer killed, fireman and brakeman injured.

20th, on St. Paul, Minneapolis & Manitoba, near St. Anthony Park, Minn., several cars of freight train derailed.

20th, on Central of Georgia, near Bostick, Ga., engine



BRAKE SHOE TESTING APPARATUS—ARRANGEMENT FOR RECORDING AMOUNT OF FRICTION.

and 12 cars of freight train derailed and wrecked. Fireman injured.

21st, on Milwaukee & Northern, near Republic, Mich., engine and baggage car of passenger train derailed on a bridge and thrown into the stream below. Three trainmen injured.

23d, on Chicago, Burlington & Quincy, at Alton, Ill., car of passenger train derailed at a switch.

25th, on Canadian Pacific, near Brownville, Me., smoking car, one coach and a sleeping car of a passenger train were derailed in a cut, the coach being hurled against a ledge and badly wrecked. Porter injured.

25th, on Wabash road, at Wabash, Ind., freight train derailed and 10 cars thrown over an embankment. Three tramps injured.

28th, on Central Pacific, near Emigrant Gap, Cal., 12 cars of freight train derailed and ditched.

29th, on Chesapeake & Ohio, at Wellsburg, Ky., six cars of freight train derailed and ditched.

30th, on Chesapeake & Ohio, at Fort Gay, W. Va., engine and 13 cars of a freight train derailed and wrecked. Fireman killed and engineer hurt.

31st, on Mobile & Ohio, near Columbia, Ill., 12 cars of a freight train derailed and wrecked.

OTHER ACCIDENTS.

3d, on New York & Brooklyn Bridge, at the New York City terminus, axle under car of passenger train broke.

5th, night, on the Boston & Albany, near East Albany, N. Y., the glass in the headlight of an engine of a passenger train was broken by an owl, which was captured by the engineer.

9th, on Pensacola & Atlantic, near Milligan, Fla., car of freight train broke down.

12th, on Missouri, Kansas & Texas, at Bell's, Tex., engine of freight train standing at the station blew out her crown sheet, badly scalding fireman and a brakeman.

12th, on West Jersey, near Franklinville, N. J., a truck under a coal car in a freight train broke down.

19th, on Chicago & Northwestern, near Lake City, Ia., engine of freight train broke both parallel rods, the loose ends badly smashing the cab. Fireman killed by jumping, engineer and brakeman injured.

21st, on Northern Central, near Parkton, Md., a large piece of a wheel under baggage car of passenger train was broken off, but was not discovered until the train had run three miles.

23d, on Boston & Maine, near Andover, Mass., all the windows on one side of the last car of a passenger train were broken by a piece of timber becoming displaced on a car of a freight passing on an adjoining track. Several passengers injured by broken glass.

24th, on Central Railroad of New Jersey, at Matawan, N. J., engine of standing freight train exploded its boiler. Fireman injured.

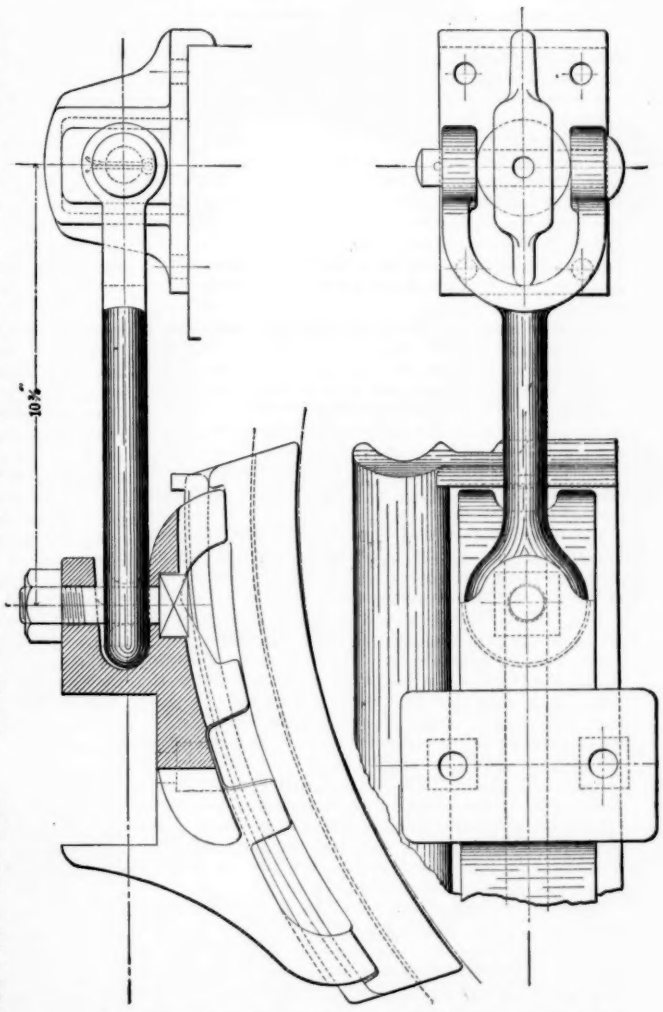
26th, on New York & New England, at Worcester, Mass., passenger train ran into some telegraph poles which had been blown down across the track in a gale. Locomotive damaged.

A summary will be found in another column.

The Brake Shoe Tests.

The following circular has been issued by the committee appointed by the Master Car Builders' Association to report upon the relative merits of different metal for brake shoes. Accompanying this circular are two cuts, one showing the Sargent swivel and automatically adjustable brake hanger, the other the arrangement in the dynamometer car for recording the actual friction of the brake shoes on the wheels. This consists of the Master Car Builders' iron brake beam, which is of the Westinghouse type, upon which the shoes to be tested are mounted. Leading vertically from each end of this brake beam are long hangers passing upward through the bottom of the car, where they are attached to each end of an equalizer or averaging bar, which extends from one hanger to the other, horizontally, and which is carried by two springs, one under each end, through which the hangers from the brake beam pass. In the centre of this averaging bar there is attached a rod leading vertically to a system of bell crank levers, which in turn move to and fro a stylographic recording pencil, the movement of which is dependent upon the deflection of the spring under each end of the averaging bar. In this manner the friction of the brake shoes will be recorded upon the paper on the table in a line depending for its contour upon the variations in friction brought about by the pressure in the air cylinder and the velocity of the sliding contact of the brake shoe and the wheel. On this same paper will appear the speed of the car during the stop.

The crooked brake hanger noticeable in the illustration has been devised to allow a satisfactory location of the hangers without cutting away the end bar of the truck frame. This circular, which has been prepared for general guidance, will be modified if the conditions developed as the tests proceed demand it.



BRAKE SHOE TESTING APPARATUS—SARGENT'S HANGER.

CIRCULAR.

The Master Car Builders' Committee to report at the Old Point Comfort Convention, in June, on the relative merits of metal for brake shoes, invites the manufacturers to submit samples of their shoes for the following tests:

1. One series of tests to be made with a standard coach fitted with four-wheel trucks, Westinghouse quick-action brake, and eight wheels braked. This series to be divided into two parts, one consisting of a series of tests made with 33-in. steel-tired wheels, with treads turned cylindrical, the other to be made with 33-in. chilled wheels, ground cylindrical.

2. A second series of tests will be made with a dynamometer car, also fitted with quick-action brake, with 33-in. steel-tired and chilled wheels, turned and ground as above, but with the brakes applied to but four wheels, all on one truck.

3. The tests will be made on a level tangent at 20 and 40 miles per hour.

4. The locomotive will be equipped with the Boyer speed recorder and an electric bell to the car, and will push the car to the required speed in each test.

5. Each test will be repeated six times, the car to carry the same load in each test.

6. Brake beams will be the Master Car Builders' standard iron beam for 15,000-lb. load, as illustrated on plate XII., M. C. B. Annual Report, 1889. The beams will be hung from the truck frames by Sargent's adjustable swivel hanger, fig. 1.

7. Brake shoes will be of the dimensions and design given on plate XII. of the M. C. B. annual report.* It is

*See the *Railroad Gazette*, July 5, 1889.

important that the dimensions be accurately conformed to. The shoes will hang ½ in. from the tread of the wheel when brakes are off, and will be so adjusted that when they are brought against the wheel they will bear on the whole surface before the power is applied. The shoes must be furnished to the committee accurately ground or turned to fit a 33-in. cylinder.

8. The diameter of the journals will be the same for all tests, and the sponging and oiling of boxes will be maintained as uniform as possible.

9. Brake leverages and pressures will be constant with each car for all tests. To avoid the possibility of slipping wheels the pressure of the shoes on the wheels must not exceed 70 per cent. of the weight of the wheels on the rails.

Apparatus to be Used in the Test.

10. To accurately measure the speed, the Boyer speed recorder will be used on the locomotive. When the dynamometer car is used the speed recorder therein will also be used to check the results of the Boyer speed recorder.

11. In the coach tests the length of stop will be measured from the point of application to the centre of car window. The point of application must be as nearly as possible at the same point for each test. The figures will be taken from track stakes placed at 50-ft. intervals and properly marked. The dynamometer car will be fitted with apparatus for recording the length of each stop.

12. The pressure in the auxiliary reservoir and brake cylinder to be recorded before and during each stop.

13. The velocity of the wind and the condition of the rail must be noted in each case together with any unusual variation in the conditions, which should be as nearly constant as possible.

14. In the case of the dynamometer car, an apparatus, as shown in fig. 2, will be used for measuring the friction of the brake shoes at all times during the application of the brake

15. Parties intending to furnish shoes for these tests should communicate with the chairman of the committee not later than March 1, and as much earlier as possible. If any large number of competitors signify their intention of furnishing shoes, it may become necessary for the committee to make modifications in their plans on account of the time necessarily occupied in each test.

16. The committee reserve the right to make such additions and modifications to these tests as further consideration of the subject may suggest.

G. W. RHODES,
E. B. WALL,
B. K. VERBRYCK, } Committee.

New Furniture Cars—Chicago, Burlington & Quincy.

The Chicago, Burlington & Quincy is building 100 furniture cars of unusually large size. Much attention has been paid to the details of the design, and they are novel in many respects. The cars are 40 ft. long and are constructed without draft timbers, the main sills of the car being dropped to the same position as that occupied by the draft timbers in the common cars.

The trusses under the cars have great camber, in accordance with the standard designs of the road. This company has paid much attention to this feature of its cars. It will be remembered that we have heretofore described some features of these trusses, which consist in using larger rods than common, and increasing materially the bearing of the washer on the end sills. Other builders are appreciating the necessity for this change, and it is noticed that many cars are now constructed on this plan.

On these cars the Fox pressed steel centre plates are being used, which are very light, and believed to be more serviceable than the ordinary iron plates. The trucks are rigid centre, and have a simple and strong appearance. The trucks are furnished with iron brake beams hung inside the wheels. The axles are without collars and the trucks are without end frames, such construction having been found by recent records on the Burlington to be sufficiently satisfactory to warrant its further use.

The body bolsters are trussed with iron rods, the trusses passing over the centre sills. The end sills are made deeper at the centre than at the ends, and through them pass the Janney couplers with which the cars are fitted. Where the sills are cut away to receive the couplers, they are strengthened with iron plates.

On the side of the car is a new air-brake indicator, which is set by the car inspector to show whether the brake is in good order or not. It consists of a shaft running crosswise of the car, upon which there are two dials painted half red and half black. The black side of the dial has upon it in raised letters "Air brake in bad order," and the red side of the dial has "Air brake in good order." The object of this device is to enable a record to be quickly made by the car inspector of the condition of the brake apparatus in such a way that the trainmen can see instantly whether the car is to be placed among the air-braked cars or not.

Dunham's side doors are used. In the ends there are doors much larger than common.

The draw gear is novel and has given better results in the laboratory of the road than all others tested. It consists of wrought-iron plates and straps of simple shape bent to form drawbar stops in such a manner as to give a minimum of weight with a maximum of strength, and the cost is found to be less than that of the ordinary construction with cast iron. In recent tests this draw gear stood 150,000 lbs. without fracture, at which pull the bolts came through the wood.

In appearance these cars are neat, resembling in style the 50,000 lb. standard Burlington freight car. They are about ten inches lower than the ordinary type, and have been especially designed to meet the demands for increased cubical contents of furniture cars in order to obtain a full carload by weight.

Notes on a New Compound Steam Turbine.*

The new motor which you kindly permit me to show you is a compound steam turbine. It has six compoundings, and consequently uses the steam six times over; but the method of its construction would have permitted any desired number of compoundings. Its weight, as it stands, is 68 lbs. It has been used to run an elevator, a pump, a dynamo. When running the elevator it developed 4,450 foot pounds of work for each pound of steam pressure. At this rate 70 lbs. steam pressure performs about 10 horse power of work. The consumption of boiler feed water required to run the turbine at 70 lbs. pressure is 585 lbs. per hour, but the net evaporation is fully 20 per cent. less than this, or 468 lbs. per hour, if two calorimeter tests, taken at another time, correctly show the average dryness of the steam. The consumption of steam per actual horse power per hour would then be 47 lbs.

Very recently this turbine has been coupled to the lighting dynamo at the Chisholm Steel Shovel Works, and with 70 pounds of pressure in the steam chest, it has run the 13 arc lights of the works at their full brilliancy.

The speed of the turbine when running the elevator was 21,000 revolutions per minute; when running the dynamo with a 13-light current the speed was between 16,000 and 17,000. In each case the speed was reduced by gears at an undetermined waste of power.

Without gears, but by direct coupling, the turbine has successfully run a specially constructed rotary pump at a working speed of about 10,000 revolutions per minute, and the power developed was apparently as great as at the higher speed with gears. The speed of highest efficiency is theoretically more than 25,000 revolutions per minute, if the half velocity of the issuing steam determines the best velocity of the wheels; but I suspect that other factors enter into that problem, and that satisfactory work may be done over a large range of speeds.

The spindle and propeller wheels which I hold in my hand constitute the entire running parts of the pump. There are two propeller wheels, a right and a left, mounted on a single shaft. Each wheel weighs 6¼ oz. The total weight of wheels, spindle and coupling to connect them with motor spindle is 2 lbs. 3 oz. I will not say just how much water these wheels throw per minute through a 3-in. nozzle, but it is *more* than 20 barrels.

The power of the steam turbine is explained by the principle that a jet of steam blowing into a vacuum will throw its whole energy into momentum. If, therefore, a turbine could be made which would utilize the entire momentum of the steam jet it would be equal in efficiency to a theoretically perfect piston engine. But the extreme lightness of steam compels a greater speed of motor than has ever been successfully used; and the elasticity of steam, as contrasted with the non-elastic nature of water, compels the compounding of the steam turbine, though compounding the water turbine would destroy its efficiency; for the momentum of the steam, though checked by the first series of buckets, recovers itself instantly by expansion, and must be checked again and again by successive series of buckets until the steam has spent its expansive force.

Professor Webb, of the Stevens Institute of Technology, says that the steam turbine may develop mechanical energy "with a high degree of economy," provided that the difficulties of mechanical construction can be overcome. He says also, "The advantages of a successful turbine are too apparent to need mention, and I hope to hear of progress in this direction."

Whether my new turbine is along this line of progress you may better judge after the following description.

Fig. 1 is an end elevation of the motor without the cover and end wheel. The lay out of the stationary chutes, or guide plates, of the turbine is shown in full lines. Dotted lines show the wheel buckets.

Fig. 2 is a longitudinal section of the motor. The arrows show the direction of flow of the steam.

The interior of the shell is divided into three chambers by two partitions *P P* parallel with the covers. The central chamber *A* receives live steam by the steam pipe entering at the top. The chambers *B B* next to the covers are for exhaust steam, which is discharged from both chambers through a single exhaust pipe *E*, which leads from a connecting passage between the chambers. The driving spindle *D* is concentric with the chambers, and is journaled in the hubs of the covers. It carries at the inner end of each exhaust chamber an aluminum bronze wheel *W W* of about 5½ in. diameter, whose inner face has six circular tongues and grooves concentric with the wheel. Into these engage similar tongues and grooves cut upon the outwardly presenting faces of flange disks *F F*, which are secured by screw threads into the partitions. All tongues bottom in their grooves, but they are separated from each other at the sides by annular spaces, the grooves being considerably wider than the tongues. Each tongue upon disks is cut slantingly across at regular spacings by steam passages, analogous to the guide plate vents of water turbines; and similar passages, but inclined oppositely to these, cut across the wheel tongues like the bucket vents of water turbines. The wheels *W W* have long hubs, inward projecting; and the bore through the flange disks *F F* is large enough to leave annular steam passages around the hubs. The hubs clamp a plain disk *d* between them on the spindle midway of the steam chamber, and this disk runs with equal clearance between the stationary rings *r r*. These two clearance spaces are the two steam ports, as shown by the arrows in fig. 2.

Each port supplies only its own wheel with steam, which flows inward to the wheel hub, then along the annular space surrounding the hub to the inner series of buckets. These deflect its course, check its velocity, and receive impulse by the reaction. The checked steam is then easily reversed in its direction by passage through the first series of stationary chutes, which have, as in every series, a much larger aggregate area of discharge than the adjacent bucket vents. While the steam is passing through the chutes expansion is accelerating the velocity of the flow, to be again checked by reaction upon the second series of buckets. And so, check by reaction, and acceleration by expansion, alternate, until finally the spent steam escapes from the circumference of the wheels into the exhaust.

An extremely slight end play is given to shaft, wheels and central disk, so that any disturbance of steam balance upon the opposing wheels will crowd the central disk toward one or other of the stationary rings *r r*. This movement partly closes the port leading to the overpressed wheel, at the same time opening wider the other port, and the equilibrium restores itself. In practice an end play to the shaft and wheels of .005 of an inch is sufficient to prevent frictional contact of wheels against their seats.

The annular spaces between buckets and stationary vents insure constant flow of steam and its even distribution around the circumference at each compounding; and whenever the speed of the wheels is below the normal, due to the velocity of the outflowing steam, there will be a circular rush of steam around these annular spaces, which will impinge against the buckets and thereby assist to propel them. Hence the annular spaces enlarge the range of effective speeds.

The advantages claimed for this compound steam turbine are: extreme simplicity, compactness, lightness and cheapness; freedom from friction, and perfect steadiness of pull with consequent smoothness of action; also, extraordinary storage of power in the momentum of steam wheels (about 10,000 foot pounds), giving unusual steadiness under sudden changes of load.* In comparison with the reciprocating piston engine the steam turbine has the advantage that no part is subject to alternate heating and cooling; hence, steam expansion operates under more favorable conditions, and may give better results. The turbine may use the highest steam pressure with advantage, for its normal speed under high pressure dense steam does not greatly exceed the speed required for the rarer steam of low pressure. The gyroscope principle is extremely developed by the steam turbine, and may yet be utilized with startling effect. But undoubtedly the first call for the perfected steam turbine will be to run the dynamo by direct couplings.

Fig. 3 is from a photograph of the motor and reducing gears which drive the dynamo. The motor is the cylinder with bulging covers at the right-hand end of the bed plate. In line with the motor-driving spindle, and coupled with it, is a small pinion, not seen in the cut, which runs between the two wide triple-toothed gears at the right of the train and engages in both. The power is then transmitted, half by one gear shaft and half by the other, to the pinions at the left of the train, both of which drive the gear between them with its shaft. This shaft runs at the speed of the dynamo whose armature it drives by direct coupling. The tota weight of motor and gears, mounted as shown, is about 400 lbs. The floor space occupied is 2 ft. 9 in. by 1 ft. 6 in.

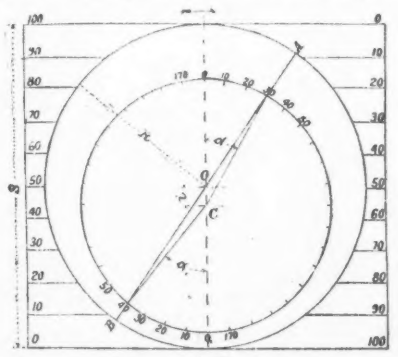
At a not distant future day you may receive a report of tests of the efficiency of this turbine more accurate and reliable than any which I can give you.

* By J. H. Dow. Read before the Civil Engineers' Club of Cleveland, Oct. 8, 1889. Reprinted from the *Journal of the Association of Engineering Societies.*

* A 1,000-lb. fly wheel of usual proportions, running 150 revolutions per minute, would store about 8,000 to 9,000 foot pounds.

Graphical Determination of Crank Angles.

The following method of quickly determining crank angles for different piston positions is from *Engineer in*



and was devised by Mr. Gustav A. C. Bremme, who writes as follows: The obliquity of connecting-rods in direct-acting engines has the effect of causing a difference in the magnitude of the crank angles corresponding to the same piston position for in and out stroke. This

i
s well known, and also that this difference increases as the relative length of the connecting rod decreases, and *vice versa*.

In setting out the valve motion of an engine with a short connecting-rod this effect of its obliquity cannot be neglected, and the knowledge of the crank angles a and a_1 (see diagram) for out and in stroke for given piston positions becomes a great convenience, if not a necessity.

In course of his research into another subject matter the writer perceived the following convenient method for finding the corresponding crank angles and piston positions, which he believes has not been published before. The annexed description and diagram will be easily understood, and may prove interesting:

Let L = length of connecting-rod,
R = " " crank,
a = crank angles for out-stroke,
a_1 = " " " in-stroke,

with the radius R representing the crank, draw a circle from centre O. Divide the stroke S=2 R in, say, 100 equal parts, draw the parallels until they intersect the circumference of this circle, and mark these parts as shown.

From centre C draw another circle with any radius and mark the degress on its surface as shown. The distance (i) between the two centres O and C is affected by the relative length of the connecting rod, and determined by the formula $i = \frac{R}{2L} R$. Thus, for instance, for a connecting of $L = 4\ R$ the distance $i = \frac{1}{8}\ R$, etc. A straight line $A\ B$ through the centre O will mark on the circumference of the circle O the piston positions and on the semi-circumference of circle (C), on the same side as point A, the crank angles (a) for the out-stroke and on the side of point B the crank angles (A_1) for the in-stroke.

From this it will be seen that, by substituting for the line $A\ B$ a straight-edge laid through the centre O, the corresponding values can be read off at a glance.

There is a slight discrepancy between the indicated and actual piston position, which, however, may be neglected, as, with a short connecting rod of $L = 4\ R$, it never exceeds ½ per cent.

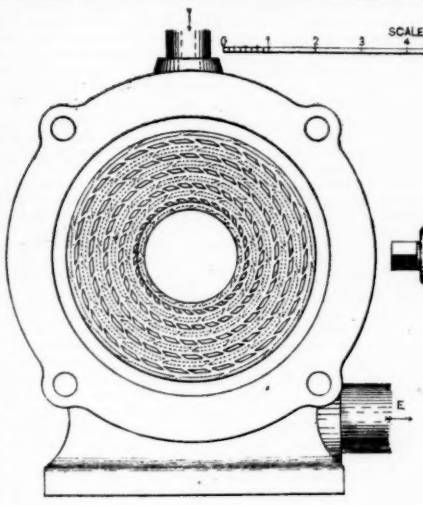


Fig. 1.

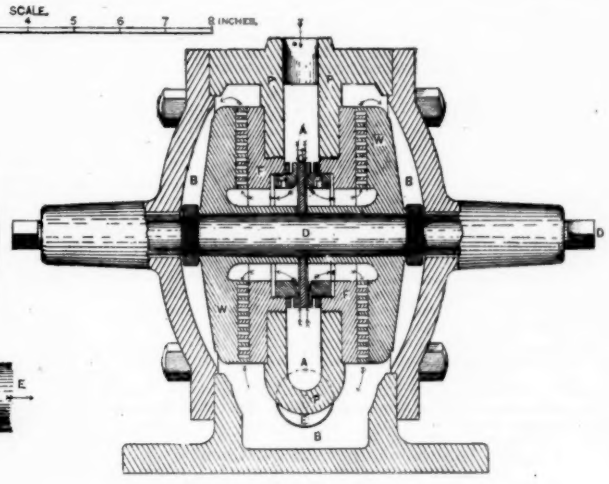


Fig. 2.

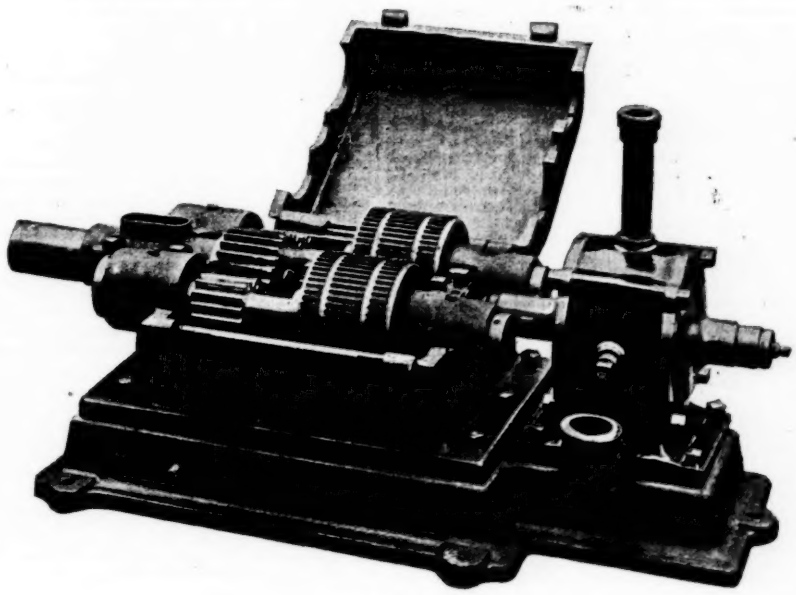


Fig. 3.

DOW'S STEAM TURBINE.

Double-Cylinder Surfacer and Smoother.

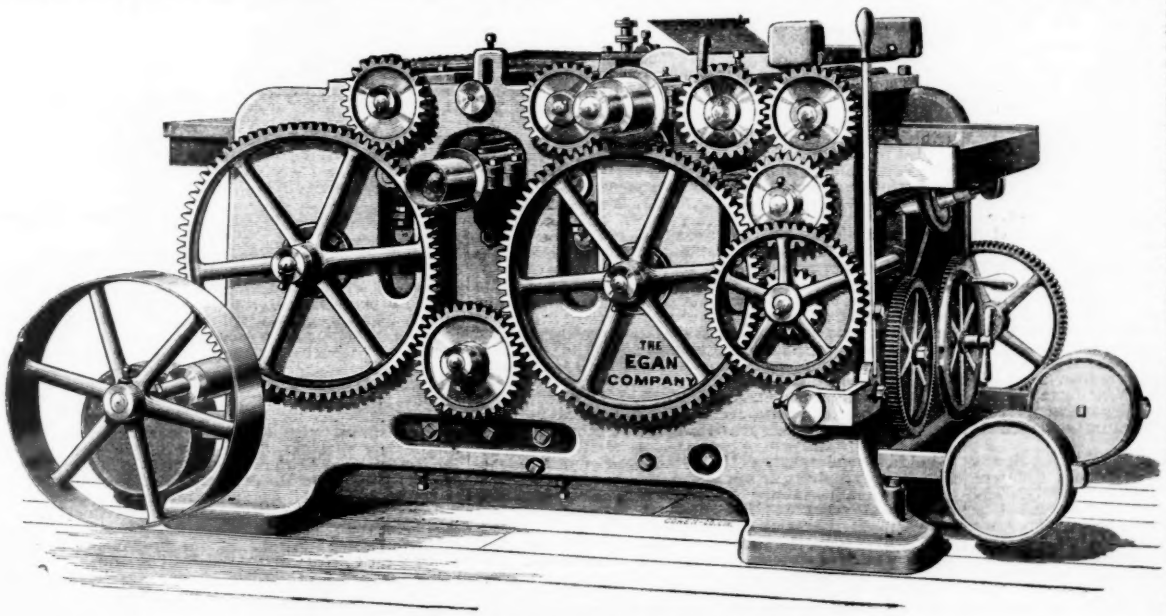
Usually where it is desired to bring stock to a fine and smooth finish on both sides, wood workers find it preferable to pass the work through a single cylinder smoother, and take two operations to accomplish the work. The Egan Co. claims to have overcome this difficulty in the double-cylinder smoother, illustrated herewith. It embodies some new principles, and it combines great strength and solidity. The machine weighs 7,500 lbs.

The frame is cored out and substantially braced and all necessary parts planed true. The main bed is fitted to planed ways in the frame and raised and lowered on inclines by means of two screws, operated by a centre pinion and hand-wheel convenient to the operator. An extra adjustment is also provided for raising and lowering the receiving plate of the lower cylinder, so as to change the amount of cut while the stock is being fed through. All adjustments are made from the working end of the machine. The feed consists of six feed rolls, of large diameter, and the fluted or front feed roll is driven by expansion gearing, making it impossible for the roll to lift out of gear when taking a heavy cut. The feed rolls are weighted on a new principle, the weights being adjustable to give more or less weight, as desired. There are two feeds to the machine, and the feed is controlled by the speed of the main cylinder, so that if the main cylinder slacks, the feed does so in proportion. The last pair of feed rolls is placed outside the lower cylinder and arranged in this way; each piece put through the machine is fed entirely through, independent of another piece following it.

The cylinders are of solid steel and made four sided, so that two or four knives may be used on the cylinder as desired. The upper cylinder is belted from both sides of the machine. Suitable arrangements are made to disconnect the lower cylinder and entire boxing, which can be taken out instantly when desired. The pressure bars work on the circle of the head, holding the stock down to the bed and close to the knife, thereby preventing tearing out and clipping of ends of boards.

One of the advantages of this machine, especially in the wider sizes, is that the stock can be passed diagonally under the cylinder instead of running the cylinder in a diagonal position. This permits straight belts being run to the cylinder and perfect balancing.

Further particulars may be had by addressing the makers, The Egan Co., 202 to 222 W. Front st., Cincinnati, O.



DOUBLE CYLINDER SURFACER AND PLANER,

Made by the EGAN COMPANY, *Cincinnati, Ohio.*

Railroad Signalmen in England.

Among the many labor problems that are attracting attention at the present time, one of the most interesting and urgent is the agitation that has been initiated among railroad signalmen for shorter hours and increased pay. The signalmen are a much more numerous body of men than is commonly supposed. On the sixteen principal roads of the United Kingdom the total number of signalmen employed in January, 1887, was 15,495. Probably, however, the total number of signalmen employed throughout the kingdom as a whole will not be less than 30,000. This important and numerous body of men may not have heavy or exhausting labor to perform, but they have most responsible duties, and there is no body of men who have the lives of the community more entirely at their mercy. A signalman ought to be continually on the alert, but unfortunately for the men and for the traveling community the average signalman is greatly overworked, and his pay is by no means proportionately high. A Parliamentary return made in May, 1888, shows that, in January, 1887, there were 4,095 signalmen out of 15,495 on the sixteen principal roads of the United Kingdom who were on duty for more than twelve hours at a time. The worst offender in this respect appears to have been the Midland, which had 1,757 men out of 1,921 employed in this way, and which also even allowed the hours of duty to exceed that limit by three hours no fewer than 436 times, while in 52 cases the limit in question was exceeded by six hours and upward. This means that 52 men were employed for 18 hours or longer at a stretch. The occurrence of accidents from mistakes or neglect on the part of signalmen—now, indeed, a frequent, if not *the* most frequent, source of accidents—is hardly to be wondered at, in view of facts like these. On the Lancashire & & Yorkshire, out of 1,112 signalmen employed, 523 were continuously employed for upward of twelve

hours, and on the Great Eastern 420 men were similarly occupied out of 898. The London & Southwestern, on the other hand, furnishes a notable example to the contrary, none of its signalmen working more than 12 hours a day.

The average wages paid to signalmen in the principal countries of Europe, are as under:

	Average wages paid per week.
England	$4.32 to $7.20
France	4.44 to 7.68
Germany	3.84 to 5.52
Belgium	2.88 to 4.20
Holland	3.36 to 5.28

The average wages of labor generally is, in France 20 per cent., and in Germany 30 to 40 per cent. under the rate in England. But, so far as signalmen go, the average wages paid in France are higher than in England, while in Germany they are very little below. In Belgium and in Holland, where the range of wages is usually extremely low, the difference is really less than might have been expected. In the United States, however, signalmen receive at least 50 per cent. more than they do in this country.

The ultimatum of the signalmen appears to be that all signal boxes should have the hours of labor limited to eight per day, and that the rate of pay should vary from 4s. 6d. to 6s. ($1.08 to $1.44). These are surely reasonable enough proposals under the circumstances. —*Industries.*

Ventilation of Passenger Cars.

At the meeting of the Western Railway Club in Chicago, Jan. 21, Mr. Creamer read an interesting paper on this subject, of which we give a brief abstract:

In the near future the vestibule system will be universal. In the present construction of cars one method of getting fresh air in is to take it from the platforms through transom panels at the ends of the car. This has never seemed to me a very good plan for the reason that when the panel is open, the inlet of air is too violent, especially to those sitting near the ends of the car. As a result of this the panel is apt to be closed all the time. The vestibuling of cars will necessarily do away with this method of inlet, poor as it is. You must get fresh air in by some other means than this, and you must do it without cold drafts; any method involving, or in any degree liable to, drafts is sure to fail. In fact, we must get the air in without the passengers knowing how it is done.

I think the proper place for the inlet is in the sides of the car body, about on a line with the windows, and not on the roof, where the smoke, cinders and coal gas follow along the sides of the clear story, and often come in, especially in tunnels, cuttings and on side hills. Our moving car at 40 miles an hour will take in the fresh air at the rate of nearly a thousand cubic feet a minute. We shall trap the cinders and drive them out nearly as fast as they come in. This small whirlwind of fresh air we will warm by contact with the heating apparatus, whatever that may be, and then distribute it all around the car—not in one place, but in 30 or 40. Each passenger may have his own register if his fancy desires to control it. In summer we would cool this air when the mercury is drifting about the nineties.

Thus far I have spoken only of getting fresh air into the car, but to get the fresh air in the spoiled air must be got out. The exit must be, I think, on the sides of the clear story, with apertures 3 or 4 ft. apart. These apertures must not admit air or cinders, smoke or rain. They must have the function of exhaust at all times, whether the car is stationary or moving. They must be the coefficients of the inlets, and the inlets will be the coefficients of the outlets. Each is as necessary to the other as the blades of a pair of scissors. It seems to me the very height of absurdity that these outlets in the clear story should be (as in many cars they are) so constructed that they must be changed by attendants with every change of the train. The moving train will do this very much better by its own motion, and when the car stops at a station there will be no cold drafts on the heads of the passengers.

The cubical space of a car is so limited that power ventilation is an absolute necessity. Cars filled with passengers are, however, often stationary, and at times for prolonged periods. For such conditions I know of nothing better than open doors or windows. Our power ventilation then stops, and we must resort to the same methods we would use in a house. These cases, however, are exceptional.

Railroad Terminals at New York Harbor.

A reporter of the New York *Times* has been making extensive inquiries concerning the movements of the Pennsylvania, Lehigh Valley and New York Central roads looking to the acquisition of additional terminal grounds fronting on New York harbor, and prints a column and a half of facts, conjectures and gossip. There appear to be but few actual improvements going on at present, though there is much activity in the courts, and the legal departments of the roads seem to be constantly on the alert to secure every advantage possible while checking rivals at every point. The substance of the *Times* report may be condensed as follows:

The present terminal facilities of railroads extend from the West Shore wharves at Weehawken southward to the Central of New Jersey at Communipaw. From Communipaw southward to Constable Hook there is a stretch of about four miles, which is valuable by reason of its nearness to New York City and to the centre of the harbor, but which can be made available only at great cost, as there are very large areas of mud flats, which must be dredged before wharves can be built and used, and many reefs which interfere with the easy prosecution of improvements. The building of piers will involve large expense for filling, as the outer lines of piers must be a long distance from the present shore line. In many places this is more than a mile. The New Jersey Legislature and the War Department of the general government have under consideration plans for improvement of these grounds.

The ownership of the property south of Communipaw, desired by the railroads, is in a half-dozen different hands, and much of it has been transferred lately. The Pennsylvania Railroad recently paid $700,000 for 3,300 feet of water front. West of Constable Hook there are a score of owners to be dealt with. Both the Pennsylvania and the Lehigh Valley have made considerable progress in securing the right of way for railroads from Newark Bay across Bergen Neck to reach the harbor front. It is claimed that the New York Central, which controls the New Jersey Junction Railroad, is making strenuous efforts to extend that road southward to the oil depots at Black Tom and Constable Hook. The Pennsylvania in its proceedings to secure right of way for its line, the Waverly & New York Bay, has had a severe legal fight with the Currie estate, and some of its work is now at a standstill by reason of this. The Lehigh Valley is actively at work improving its land already acquired near the Central of New Jersey terminus, at Communipaw. Its trackage agreement with the latter road, by which it reaches this terminus, is said to be for five years. There seems to be an impression that the Lehigh Valley and Pennsylvania will unite in a single bridge across Newark Bay. The Lehigh Valley has lately purchased large tracts of land at Cavan Point. Purchases and options covering its lines through Jersey City, in the direction of La Fayette and Monitor streets, have been secured.

Speaking of the joint use of terminals by different railroads, the New York *Evening Post* says: "But to obtain the best results it requires a surrender of independence on the part of individual companies which jealousies may render difficult, but should not be allowed to defeat. The West Shore Terminal Company owns in New Jersey a road along the North River from the uppermost railroad plant to a point where access can easily be had to Staten Island. This road could be used by all the corporations along the river as a common line to any great terminal which time may establish upon that part of New York harbor. It is in every way possible that we may see upon Staten Island facilities for the transfer of traffic between ships and cars unequalled even in England. It is also improbable that any one road will have the monopoly of the great facilities which the future may see upon New York harbor, no matter which one first conceived the plan. And it will be much better that all should share in such improvements, for the concentration will yield greater terminals at a less cost to each road per unit of traffic. As Mr. Garrett once remarked, all the merchandise dealt in at New York seems in transit through the streets upon trucks. A more expensive method of conducting business could scarcely be devised."

TECHNICAL.

The Union Bridge Company.

This company will concentrate its bridge plant at Athens, Pa. The shops at Buffalo will be given up. This implies no change in the policy of the company or in its membership. It is simply a measure of business economy. The capacity of the Athens shops will be greater than that of the two shops, which have been heretofore operated separately.

A Steel Mill Accident.

On the evening of Jan. 18 a converter burst in the works of the Illinois Steel Co., at South Chicago. One workman was killed and four injured.

Steel Car Transfer Steamer.

F. W. Wheeler & Co., of Bay City, have contracted with the Canadian Pacific for a steel car transfer steamer, to be used between Windsor and Detroit, Mich. The vessel is to be about 295 ft. over all, 41 ft. beam, 17 ft. moulded depth, and to have a draft of 11 ft. 9 in., when carrying a deck load of 640 tons and 60 tons of coal in her hold. She will be a side wheeler, with a separate engine for each wheel. The engines will have a stroke of 9½ ft. with 50-in. cylinders. The propelling wheels will be 28 ft. in diameter. There will be four boilers, each 13½ × 14 ft., carrying a pressure of 85 lbs. The vessel is to be finished next October.

An East River Tunnel.

The East River Railway Co., organized the 16th inst., electing Mr. Benjamin S. Henning President and Mr. George S. Morison Consulting Engineer. The company proposes to construct a tunnel from a point near the foot of Broadway in Brooklyn to a point near the foot of Broome street in New York. It proposes to use the Henning Gravity Tunnel system. Surveys will be begun very shortly. The tunnel will be for double track. It is proposed to use a combined gravity and cable system. Trains will be dropped down an incline, acquiring momentum enough to carry them across the level, and drawn by a cable to the top of the incline at the other end.

The Slide Railroad.

The Slide Railroad Co. (chemin de fer glissant) has asked for a concession from the City of Paris for an elevated road three kilometres long from the Place Clichy to La Villette. It is proposed to run trains every minute and to carry 12,000 passengers an hour.

The Chicago River Canal.

At the recent annual meeting of the Western Society of Engineers, briefly reported in our last issue, a paper by the retiring President, Mr. E. L. Corthell, was read, in which attention was called to the project for canalization of the river flowing through Chicago. Mr. Corthell said:

"The river which meanders through the heart of the city requires bridges and tunnels for crossing it, and that same river (if it be a river) receives the sewage of nearly a million inhabitants, and yet has no natural outfall except into the lake whose water these inhabitants drink. This state of affairs in a city growing like ours has led to a development of plans and nearly to their realization, which will not only, when carried out, remove from us, through the purifying influence of a great body of fresh water flowing toward the Mississippi, the sewerage of the city, but will also furnish an enlarged water transportation between the Great Lakes and the Gulf of Mexico. Here, certainly, is a field for the highest class of engineering; here are difficult problems in hydraulics and in construction which are presented for immediate solution. Let it be remembered that the metropolitan district of Chicago has not attained its growth—far from it. That growth is still phenomenal among the cities of the earth, it being estimated by statisticians that the rate of growth at the present moment is 900,000 per decade, with an increasing increment. No one can forecast the future or predict the magnitude of the city where we have cast our lot as engineers, nor can any one measure the possibilities which are before us as a society of engineers."

Judge Prendergast, of the Drainage Commission, referred to a prophecy he made at a banquet of the society in 1887, when he claimed that the time was coming when a great water-way would be made from the lakes to the Mississippi. It was useless to think of constructing a giant sewer only; the people of Chicago and the trustees were committed irrevocably to a great water-way. The law will not permit anything else than that a great navigable channel shall be made between Chicago and Joliet. "Only one question is under discussion by the trustees elect. That question is, 'What is the best mode of testing the constitutionality of this law?' He said that in a few days this would be decided. One of two plans or modes would be adopted. The first would be for the board to organize and attempt to do something, when proceedings would no doubt be begun, either by a bill in chancery or by quo warranto proceedings to stop them. The case could thus be brought up to the Supreme Court and settled. This plan was open to the objection that it afforded opportunities for lobbyists and organized capitalistic enemies of the project to get in their deadly work, and delay, if not defeat, the will of the people. The other mode was by mandamus proceedings, to compel the issuance of certificates of election to the trustees. This plan has the advantage that it will be a friendly suit, in which the respondents will be high, honorable, disinterested officials, anxious to reach a fair and legal decision, and the plaintiffs the trustees of the people, anxious only to prevent delay and begin the work of constructing the grandest monument of the century."

Train Dispatchers' Signal System.

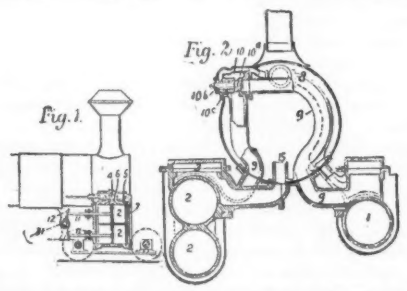
A scheme has recently been brought out at Boston for establishing a new method of communication between conductors and the train dispatcher when trains are disabled or detained by accidents or obstructions along the line. The system also combines a registering time check upon track walkers, bridge inspectors, etc., and is designed to do for railroads what police and fire-alarm telegraphs do for cities. The plan is to establish along the line of a road a closed electric circuit, having at suitable intervals signal boxes, each containing a make and break mechanism, so constructed as to send over the wire its distinguishing number, an audible or visual signal device and an ordinary telegraph key, all of the boxes being accessible to the train crews. The circuit terminates in the train dispatcher's office. The signal boxes are to be placed 1,000 or 1,500 ft. apart, and are furnished with locks and keys identical with those used on switches. The boxes are all alike except in the circuit closing device on the wheels in the "ringing-up" boxes, this being necessary in order to give a distinguishing signal over the line for each box, in order to indicate its location. In order to simplify the matter of signaling by the train conductor a special code of signals is proposed, which can be printed in convenient form for the pocket, to be carried by train conductors and brakemen.

A further use of this system consists in the preservation of a check upon track walkers, whose duties will be to signal from designated points along their sections to show their whereabouts. In cases of washouts, broken rails or obstructions, they can give immediate notice to the train dispatcher's office.

The proprietors of this system are the Train Dispatcher's Electric Signal Co., 113 Devonshire street, Boston.

A Recent Patent on Compound Locomotives.

The following is the description of a patent recently granted to R. H. Lapage, London, for improvements in compound locomotive engines: 1 is a high-pressure cylinder, and 2 2 are two low-pressure cylinders of an outside cylinder compound locomotive engine. The two low-pressure cylinders are, in the example shown, arranged one directly above the other, and provided with one steam chest 3, and with one distributing valve 4 that is operated by a link motion in the ordinary manner. The upper of the two cylinders 2 is formed with steam and exhaust ports and passages 5 and 6 respectively of the ordinary form, and communicates with the lower cylinder at each end by connecting ports or passages 7. By this arrangement the two low-pressure cylinders, which are of equal diameter and length, both receive steam from the steam chest at the same time, the exhaust from each also taking place simultaneously. A pipe 8 conveys high-pressure steam to the high-



pressure cylinder 1, and a connecting pipe 9 conveys steam from this cylinder to the low-pressure cylinders 2 2. This connecting pipe may be fitted with a valve case 10 containing combined intercepting and starting valves respectively constructed to operate in an automatic manner as described in the specification of Letters Patent No. 310 of 1887, granted to the present inventor. The interrupting valve in this example is a disc valve 10a carried by a guide plunger 10b and the starting valves are in the form of plungers 10c. The pistons of the two low-pressure cylinders are connected by their rods 11 to one slide block or crosshead 12 that is guided in the ordinary manner and coupled to one end of a connecting-rod 13, the other end of which is coupled to the crank pin 14 of the driving shaft in the usual manner. 15 is the ordinary exhaust or blast pipe common to both low-pressure cylinders.

Compound Locomotives on the London & Northwestern.

Ever since Mr. Webb introduced compound locomotives on the London & Northwestern he has taken steps to test the capabilities of these engines for hard work in the most thorough way, and he is now making with them exceptionally long runs without dropping fires. We have had placed at our disposal interesting particulars of such a run made during the present month by the "Teutonic," an engine of the same class as the "Dreadnought," already illustrated and described in our pages, and of this run we propose to give an account. On the 3d inst. this engine left Crewe at 12:13 a. m. with a train for Euston, arriving at the latter place at 3:50 a. m. At 10 a. m. she left Euston with the Scotch express to Carlisle, where she arrived at 4:25 p. m., the driver and fireman being changed at Crewe en route. At 8:41 p. m. the "Teutonic" again left Carlisle with a train for Euston, arriving at 3:50 a. m. on Dec. 4, the men being again changed while passing through Crewe. At 10 a. m. on the 4th she again left Euston for Carlisle with the Scotch express, the men being changed for the third time on arriving at Crewe, at 1:14 p. m., and Preston being reached at 4:25 p. m. Finally at 8:41 p. m. the "Teutonic" again left Carlisle and took her train through to Crewe, where she arrived at 12:07 (midnight), thus accomplishing a run of 1,200 miles, with one steam raising and without dropping her

fire. The engine was worked during the trip by drivers B. Robinson and W. Elliott, and firemen G. Stretch and J. Stockton, all stationed at Crewe, the men changing as noted above The engine was away from shed 47 hours 53 minutes, and was actually in motion 24 hours 57 minutes, the average speed being thus 25.06 miles per hour away from shed, and 48.09 miles per hour during actual running.

The quantity of coal burned during the entire trip was 367 cwt., this giving an average consumption of 34.2 lbs. per mile, an excellent result with such trains. The "Teutonic" was put in service on April 9 last, since which date she had, previous to making the trip above described, ran 50,903 miles, and during the week previous to making the 1,200-mile trip she ran regularly from Crewe to Euston, thence to Carlisle, and thence back to Crewe—a round journey of 600 miles—on alternate days, the engine being worked by two sets of men who changed at Crewe. She is now continuing the same service o.: alternate days with her sister engine "Oceanic." In conclusion, for convenience of reference, we may give the chief dimensions of the "Teutonic." She has two high-pressure (outside) cylinders 14 in. in diameter and one low-pressure (inside) cylinder 30 in. in diameter, the stroke in both cases being 24 in. The two pairs of driving wheels are 7 ft. in diameter, and the boiler, which is worked at 175 lbs. per square inch, has 1,405.5 sq. ft. of heating surface, of which 159.1 sq. ft. is fire-box surface and 1,242.4 sq. ft. tube surface. The fire grate area is 20.5 sq. ft., and the weight of the engine in running order 45 tons 10 cwt.—*Engineering.*

Forced Draught.

In consequence of the many breakdowns which have attended the application of forced draught on board ship, the British Admiralty has authorized Mr. W. A. Martin, of Blackfriars road, London, to carry out a series of experiments at Portsmouth with a new system of which he is the inventor. A pair of the old locomotive boilers will be used for the purpose. Mr. Martin proposes to approach as nearly as possible the conditions of working locomotive boilers on shore. Instead of forcing the air through the furnaces by means of fans, he prefers to establish induced draught. His plan is to operate at the foot of the funnel by a fan acting upon the products of combustion, and so fitted that it may be used to accelerate the draught to any degree required. The arrangements in the boiler room are not interfered with, the driving gear taking the place of the high-speed engines now used for forcing air.

President Ingall's Car.

The Wagner car shops at East Buffalo have just completed for the Cleveland, Cincinnati, Chicago & St. Louis a private car for the use of President Ingalls, the cost of which is about $20,000. The exterior is painted a bright orange, with wine-colored letter board. The observation and drawing rooms are finished in English oak, which, the reporter states, "has an unusually beautiful grain." The parlor has a tile and brass fireplace, which is intended to burn gas. The floors are all of oak, mahogany and maple, and they will be covered with rugs instead of carpets. The car has steam-heating pipes, hot and cold water, Pintsch gas, and wires for electric lights. It is 68 ft. 6 in. long.

Boring Long Holes Through Solid Metal.

It is not unusual to bore holes from the solid up to between three and four inches in diameter and several feet in length. In the manufacture of the Hotchkiss gun the blank tube is finished, as far as its bore is concerned, by four operations. The first tool bores a hole from the solid clear through the blank, leaving only material enough to be taken out by the following tools sufficient to provide the necessary fine finish. The other tools finish the surface and cut and finish the grooves of the rifling.

The tool doing the first boring is formed at its end, which constitutes of course the cutting part of the tool, with steps. The object of stepping the cutting end in this manner is to reduce the width of the chip so that it will pass freely through an angular groove made in the side of the tool and out at its opposite end. One side of the tool is provided with a recess, which is formed by cutting a rectangular groove, which is then covered by a cap piece. This forms a whole along one side of the tool. The other side of the tool is cut away into a very obtuse V shape, which extends from the cutting head back the entire length of the tool as does the other channel. By means of a pump, oil is forced through the rectangular hole down to the apex of the tool, when it flows back through the angular groove, carrying with it the chips cut by the stepped edges of the cone. This has been found in practice to work admirably, no clogging of the chips causing any inconvenience whatever.—*Iron Age.*

The Continental Iron Works.

One of the busiest and most progressive iron and steel working firms in the East is the Continental Iron Works at Greenpoint, Brooklyn, N. Y. Its latest adopted process, and one which bids fair to be a very important one, is for welding, corrugating and flanging boiler tubes. This improvement in boiler practice has been in use many years in Europe, and few marine boilers are built there now without it. This company has supplied all the furnaces for the government cruisers "Baltimore," "Newark," "Philadelphia" and "San Francisco," gunboats "Bennington," "Concord," "Petrel" and "Yorktown;" and has also furnished them in large numbers to the merchant marine, all the more recently-built coastwise vessels on both the Atlantic and Pacific coasts having their boilers supplied with them, while many have also been furnished to vessels plying on the Great Lakes. It was at this works that the original "Monitor" was built for Capt. John Ericsson by Mr. Thos. F. Rowland, who is now the President of the Continental Iron Works, and afterward several other vessels of the same type were built here for the U. S. Government.

Bridge Accidents.

On the 15th inst. the end of the approach bank of the Merchants' Bridge, St. Louis, on the east side of the river, was undermined by the current. The dump next the east pier was damaged and the buttresses washed out. Timbers and ties, with rails from the temporary railroad, went into the stream. The damage was at once repaired.

The Louisville & Nashville bridge near Carbondale gave way Monday night, the 13th inst., and completely blocked traffic for a short time on the Memphis division. All passengers and freight business for Memphis was transferred by the way of Nashville.

An English Band Saw for Metal.

A new, powerful, self-acting metal band-sawing machine, the many advantages of which have been pointed out by the *Railroad Gazette* frequently in the past, has been built by the Northern Machine Tool Works, at Newcastle-on-Tyne, England. The machine consists of a strong hollow casting, with an overhanging arm firmly bolted thereto and fitted with a vertical slide carrying the top pulley, which is adjustable by a screw to compensate for various lengths of saws, and is provided with a strong lever and heavy weight to give the requisite tension to prevent the saw slipping. The saw pulleys are 48 in. in diameter, the periphery of each being covered with an india-rubber tire, and they are suitable for saws varying in width from ¾ in. to 2 in., according to the work to be performed. The lower pulley is cast with a spur wheel on its outer rim, and is driven by double-purchase spur gearing and a three-speeded driving cone. This bottom pulley revolves in a trough of soapy water, and thus keeps the saw perfectly cool and lubricates the cut at the same time. The table is self-acting at 12 different rates of feed to suit the various thicknesses of work to be operated upon.

Large Casting of Swedish Steel.

The Bofors Engineering Co., Sweden, has just dispatched an unusually large steel casting to the Elsinore Shipbuilding Co., Denmark. It forms part of the keel and stern-post of a new ice breaking steamer, and measures 35 ft. in length and 14 ft. in breadth. The state railroads were not able to convey it, so it had to be brought to Otterbücken, and from there by water to Gothenburg. From this town it goes by rail to Helsingborg, as none of the steamers from Gothenburg could receive it on deck. A similar casting has been ordered for another ice-breaking steamer.

Electric Power Transmission.

The Sprague Electric Railway & Motor Co. is about to erect an electric power transmission line in the Transvaal. The source of power is a waterfall, from which it is expected that 140 electrical horse power can be obtained, which will then be transmitted over a suitable line three miles in length, to work the machinery of one of the gold mines in the district.

The Sullivan Driving-Box Wedge Bolt.

This device we illustrated Jan. 1, 1887. At that time it had been used for five years on the Northern Central Division of the Pennsylvania Railroad, and the Pennsylvania Railroad had purchased the right to manufacture and use it. Since then it has been successfully applied to many engines of the company, both in passenger and in freight service. The object of the appliance is to prevent the driving-box wedges from working up and causing the boxes to stick and heat. It also provides for an even and accurate adjustment of the wedges.

Notes on the Compound Locomotive.

A compound locomotive for passenger service built on the Worsdell and Von Borries system for the Argentine Midland Railway was illustrated in *The Engineer*, Dec. 27, 1889. The locomotive was constructed by Messrs. Neilson & Co., Hyde Park Locomotive Works, Glasgow, to the designs of Mr. E. Harry Woods, Westminster, S. W. The following are the principal dimensions: Diameter of high pressure cylinder, 16 in.; diameter of low pressure cylinder, 23 in.; stroke, 24 in.; diameter of driving wheels, 5 ft. 6 in.; heating surface in tubes, 822 sq. ft.; heating surface in fire-box, 79 sq. ft.; total heating surface, 901 sq. ft.; area of grate, 16¼ sq. ft.; weight in working order on coupled wheels, 23.15 tons.

The Niagara Falls Carriage Bridge.

The statement sent out from Niagara Falls to the effect that two of the guys of the carriage suspension bridge snapped and fell into the river during the gale of Jan. 13 was erroneous, as an investigation showed that nothing had been broken. The improved system of storm stays, introduced in the reconstruction of the bridge last spring, enabled the structure to withstand a gale of much greater velocity than that which wrecked it last year.

THE SCRAP HEAP.

Notes.

A scheme is on foot by a French company to bridge the Bosphorus.

The Paris, Lyons & Mediterranean road in France is about to try continuous car heating by steam from the locomotive.

The Denver, Texas & Fort Worth has decided to construct large shops, roundhouse and extensive yards at Fort Worth, Tex., and also a large warehouse for the storage of freight and a new station.

The Governor of Rhode Island in his annual message recommends the establishment of a more effective railroad commision, to be composed of three members. The state at present has a single commissioner whose powers are very limited.

The Canadian Pacific has just completed its telegraph line to Halifax, N. S., and now controls a line from the Atlantic to the Pacific. For 400 miles in New Brunswick and Nova Scotia right of way had to be secured from adjoining farmers, as the Western Union's franchise kept the company off the railroad land.

The scheme for building new railroads in South America has been made the subject of voluminous dispatches from Washington the past week. Judge Granville P. Hawes, of New York, is named as one of the trustees, and it is said that a fund of $200,000 will be at once raised for the purpose of making surveys.

Judge Newman, of the United States Court at Atlanta, Ga., has enjoined William A. Wright, Comptroller General of Georgia, from further proceedings against the Pullman Co. in the effort to collect taxes on its cars. The state had lately seized one of the cars on account of failure to pay taxes under the Georgia State Tax act of 1888.

Argentine Railroads.

The railroads of the Argentine Republic are having their experience of state control. Some time ago the government issued a decree warning all railroad companies to put their lines in proper order by Jan. 1, 1890, under pain of interference on the part of the authorities. There had been complaints of lack of rolling stock, delays of service and defective station accommodation. The government suspended the guarantee on the East Argentine by way of enforcing certain improvements. The country through which this line passes does not appear to have had any great cause of grievance against the railroad company, and the local press condemns the action of the government. The Northern Railway Co. has had more or less difficulty arising out of a derailment for which the provincial government blamed the company, and fined it $2,500.

Russian Railroads.

The Czar has approved the project to construct a railroad on the shore of the Black Sea, from Novorossisk to Novosenck.

Extensive improvements will be made on the railroads in Southwestern Russia in the spring. A double-track line will be laid from Imerinka to Birzoula. Military depots will be established at the Rovno, Kovel and Kazatine stations.

On Friday last, a workman on the new Merchants' Bridge, at St. Louis, became dizzy and fell 90 ft. to the water, but struck head first and came out but little injured.

A Denver paper reports that the sale of the Guatemala Central Railroad to a French syndicate has fallen through. The time for the payment of the money was extended several times, but it was not forthcoming, and the American owners have refused to wait longer.

The Pullman shops are rebuilding a number of combination parlor and sleeping cars, in each of which an outdoor observatory will be provided. The windows and door at one end are set back about four feet, and the platform enlarged that amount. The space thus secured is railed in, and the car has a vestibule at the other end only.

A Denver paper is authority for the statement that a runaway engine on the Denver & Rio Grande ran 90 miles from Salida, on January 12, without encountering any obstacle, the dispatcher having succeeded in keeping all trains out of its way.

No Smoking—Out Loud.

It is perfectly astonishing how blind some people are to prominently displayed signs or placards in a railroad depot. The sign, "No Smoking," almost universally displayed, is perhaps the most frequently overlooked, and the man who is in other respects gentlemanly and sound in reason, lights his pipe and settles himself for a quiet smoke, or even with his eyes fixed with a blank stare of unconsciousness on the suspended prohibition of indulgence in the weed. I saw a good device recently in a depot in Vermont. A man came in smoking an unfragrant "Havana," when the solemn stillness which the chilling atmosphere of so much "cheek" cast around was broken by the sharp clanging of a gong, and every one (our smoker included) looked at once toward the origin of the sound, and there was the familiar placard, "No Smoking," while underneath was the brass gong connected by a wire with the agent's office, and arranged so that by touching a button in the wall the agent could at any time put the "admonisher" into practical operation. One dose of this medicine usually effected a cure. —*New England Correspondent of the Station Agent.*

To Cross the Straits of Mackinac.

Senator McMillan, of Michigan, has introduced a joint resolution instructing the Secretary of War to cause an examination to be made into the practicability and expense of tunneling or bridging the Straits of Mackinac. There are two railroads running to the straits and connecting there with upper peninsula roads. One of these is the Michigan Central, and the other the Grand Rapids & Indiana, owned and operated by the Pennsylvania. Communication is now kept up by ferry. Several other railroads are proposing to extend their connection across the straits.

Train Robbers.

A dispatch from Tulare, Cal., states that on Tuesday morning of this week two masked men robbed a Southern Pacific express car of $25,000 near that place. The robbers secured their booty before the passengers discovered the cause of the stop. The engineer and firemen were invited to take a drink with the robbers, and were compelled to walk some distance away from the train in order to facilitate the robbers' escape. A tramp who crawled out from under one of the cars to find out what was going on was taken for a trainman and was shot and mortally wounded.

Grade Crossings in Connecticut.

The total number of grade crossings in the state at present is 1,184. The Housatonic reports four new crossings during the year and the Connecticut Valley two. In both cases the Commissioners say that the additional crossings are illegal, not having been authorized by the board.

The law concerning grade crossings adopted at the end of the session last year has effected practically nothing toward the elimination of the crossings at grade. The Railroad Commissioners have estimated that it will require $20,000,000 to remove all of the crossings in the state.

The law contemplates the removal of one crossing for every 60 miles of road operated by each railroad company in the state. In all cases where the directors fail to order the removal, the Railroad Commissioners have authority to take the initiative. But the Commissioners will not be likely to avail themselves of this prerogative until the law has had one year's trial.

A New Chicago Shipyard.

The plans and specifications for the new Chicago shipyard of the Globe Iron Works Co. have been completed and work will be commenced at once. A contract for building one of the three slips has been made, and contracts for constructing the other slips and buildings will be let soon. The company expects to begin work on the two boats ordered by the Minnesota Iron Co. about the middle of March and not later than April 1. The yard is located on the Calumet River, extending from One Hundredth street to One Hundred and Second street, a distance of 1,300 ft. The average depth is about 750 ft. The whole length of the yard is bounded by the river on the one side and the Pittsburgh, Ft. Wayne & Chicago Railroad on the other. Beginning at One Hundred and Second street are three slips 400 ft. long by 100 ft. wide. The intention at present is not to launch into the river, but into the slips, although the company contemplates converting one of the slips into a dry dock at some future date.

Gas in the Hoosac Tunnel.

Fifteen employés of the Fitchburg Railroad at work in the Hoosac Tunnel were recently overcome by gas. Some were found unconscious and taken to North Adams, while the worst cases were taken to the hospital at Fitchburg. The suffocation was caused by the heavy atmosphere arresting the circulation in the tunnel.

The Harris Car Co.

At a meeting of the stockholders of the Harris Palatial Car Co., held in Boston, Jan. 11, W. W. Carter, of Boston, was elected a director in place of Gen. H. E. Paine, of Washington, D. C., resigned.

The car which this company is building at the shops of the Wason Mfg. Co., Springfield, Mass., is nearly completed.

The company's offices are in Rooms 20 and 21, Globe Building, Boston.

RAILROAD GAZETTE

Published Every Friday,
At 73 Broadway, New York.

EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood tha we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

Our correspondent, G. B., whose letter appears in this issue, inclosed a sketch showing a type of engine which may be described as an eight-wheel engine with two wheels in the rear to carry the tank and coal and the rear of the engine. Such a locomotive has one pair more wheels than is necessary for the Forney type. Its operation would not be different from the Forney engine, because it is constructed in essentially the same way, except it has the four-wheel truck under the cylinders instead of under the tank. One of the advantages of the Forney engine is that the truck is placed in a position where axles having bearings outside of the wheels can be used, such axles being easily kept in repair and less liable to heat. Regarding economy of the English engine when compared with the American engine on a basis of coal per mile, to which our correspondent refers, there is one point which must be remembered, and that is that the load hauled by the English engine is invariably less than that hauled by the American, and therefore the pounds of coal used per mile will necessarily be less. The only fair basis for comparison is that of coal used per ton mile with the speeds and grades taken into consideration. As our correspondent suggests, there are types of suburban engines used in England which are worthy of trial here, and there is, in fact, a tendency on the part of locomotive designers in the United States to appreciate this and to incorporate in the designs of suburban, and even road engines, such features of the English engines as they find desirable. Mr. George Richards, formerly Master Mechanic of the Boston & Providence, when in Europe several years since, made a rather extended study of the suburban engines there used, and on his return made several designs with a view to the embodiment of those features of the English engine which he considered best. The difficulty which he met with was in obtaining sufficient coal and water space for the long runs which the engine had to make in suburban traffic out of Boston.

In this issue appears the circular of the committee appointed at the last Master Car Builders' Convention to report upon the best material for brake shoes, which was referred to in an editorial in the *Railroad Gazette* last week. This circular has sixteen items and is accompanied by two cuts. Those interested in the tests should carefully read the circular and familiarize themselves with its contents, particularly with respect to items Nos. 6, 7, 15 and 16, as they refer to the character of material to be furnished and to the attitude of the committee toward the manufacturers. A rough estimate of the number of different kinds of brake shoes which will be furnished to be tested is 10, and as this calls for 240 individual tests, the necessity for the elimination of all unnecessary tests and repetition of tests becomes evident, and it may be well, therefore, to again call attention, as we did last week, to the necessity for a careful selection of the shoes to be tested, for the reason that when the tests are under way, if the material is found to be defective or not exactly what the manufacturer thought he had furnished, there will be some difficulty in getting permission for a second test. Those who are familiar with the Burlington brake tests will remember that there was quite a difference in the action of the different kinds of brake shoes, and with the same brake shoes, before and after the bearing was made uniform over the whole face of the shoe. Already the present agitation of the subject has changed the opinions of one or two brake shoe manufacturers, and they are changing considerably the character of the material in their shoes, and are proposing to furnish a different material from that formerly furnished by them to railroad companies. It will be seen from this that the action of the convention in appointing a committee has begun to bear good fruit. In these tests friction will be given the first standing, after which will be considered wear and cost; therefore, it will be best for all to furnish shoes giving the maximun friction rather than those which have the best wearing qualities. The committee is in earnest, and is taking all necessary steps to bring about results valuable to every one interested in such subjects, and results which will be accepted by all because of being accurate beyond dispute. It is expected that while it may be necessary to reduce the scope of the tests, yet it is intended that as far as they go they shall be decisive. The committee reserves the right to change the programme published to meet any conditions that may arise; but changes are not expected, as the circular has been well considered.

The Weak Point in our Traffic Associations.

Traffic associations have two distinct objects; to secure joint action of railroads as a body in matters affecting the public, and to insure good faith on the part of the different roads towards one another under the agreement itself. For instance, the trunk lines a few years ago arranged certain differentials for the different seaports; and they also arranged among themselves what percentage of the traffic to the respective points each road should carry. The first was a public question; the second was an administrative measure on the part of the railroads themselves. To be really useful, an association must deal with both sorts of problems. It must have a judical department to arbitrate between conflicting interests, and an administrative department to see that the results of such arbitration are executed fairly, without prejudice to any of the different interests.

Down to the time when the Interstate Commerce law was passed, these two things had developed side by side. The law produced a separation. By the prohibition of pools it rendered the second set of objects much more difficult to attain, and forbade what had hitherto been the most efficient means for accomplishing them. The necessity for harmonious action was as great as ever; the problems to be dealt with were even more complicated than before; but the power of insuring mutual good faith in dealing with these problems was crippled.

The Interstate Commerce Commission underrates the gravity of this difficulty. So do many of our leading financial houses. We are not sure that Mr. Walker himself sees its full significance; or, at any rate, if he does, he deems it the wiser policy to ignore it. There are so many instances in which joint action is imperatively needed, where the law does not forbid it, and where the Commission encourages it, that it has seemed to him best to go on in these lines, and leave the prohibition of pools to take care of itself. There are many questions of policy which the roads must settle jointly. Uniform classification, fair treatment of different localities and competing industries all require joint action of different systems, which shall agree to work in harmony.

The need for judicial work of this kind is so great that strong efforts are made to develop this side of the railroad associations; while the administrative side hampered as its work is by the law against pools, is relatively neglected. Financiers wish for more explicit declarations of policy. Mr. Walker and his associates wish for better organized boards of arbitration, with more power to make their awards binding. We do not deny the need for improvement in this respect. We agree with the Interstate Commerce Commission in believing that the law makes the legitimate action of traffic associations more necessary than ever. But we doubt whether the result is to be secured by declarations of policy, however unanimous, unless there are means of carrying that policy into execution when some of the parties have become indifferent or secretly hostile. To give more nominal weight to the award of arbitrators without additional means of enforcement would bring a greater strain upon the friendly relations of railroads than now exists. To increase the nominal requirement of obedience and leave the actual power of control as it is would mean less obedience instead of more. An agreement is as strong as its weakest part. Increase its force at other points, and you simply increase the strain at the critical one.

It is the administrative side which is the conspicuously weak point in our associations as at present organized. No serious effort has been made to supply the place left vacant by the prohibition of pools. The allowance of differentials has hardly passed beyond the stage of guesswork. There is nothing to prevent subordinate and perhaps wholly irresponsible agents of one line from diverting traffic which legitimately belongs to another. Neither by the law nor by the articles of agreement of the Interstate Commerce Railway Association is there any way of shutting the stable door until after the horse is stolen. The framers of the articles of association could not shut their eyes to the probable contingency; but they adopted a vague resolution as to competitive traffic which is wholly inadequate to meet the demands of the case.

It is not at all easy to say just what would be adequate. But we can point out several preliminary conditions which must clearly be fulfilled before we can have anything adequate. In the first place, there must be fuller and more independent reports of competitive traffic. The English clearing-house does not depend wholly upon information given by the companies composing it, but has employés of its own whose sole duty it is to make reports of the car movement from one line to another. Such employés are found at all important junction points. Their primary purpose is to keep track of the rolling stock; but incidentally they contribute a great deal to the publicity of traffic operations in general. Of course their services are somewhat expensive in the first instance; but the indirect effects are advantageous enough to pay the expense many times over.

We admit that it will be hard to make a plan of this kind work. But our railroad men are accustomed to digest hard problems; and Mr. Walker himself has not been pampered with a diet of easy ones. That arrangements of this sort can be carried out on this side of the ocean is clearly shown by the history of the Southern Association. That something of the kind is imperatively needed in the Central West seems to us equally clear. Though the conditions of the past year have been in some respects quite favorable, the Interstate Commerce Railway Association has shown itself inadequate to do what is needed. Reform must begin at the weakest point—the administrative department. In pursuing this course mistakes probably will be made; but any other course is a mistake from beginning to end. To give more authority to the arbitrators, or make more explicit agreements as to policy, without additional executive power underlying them, is to build a heavy house upon defective foundations. Under present circumstances there are three alternatives under an arbitrator's award—acceptance, rejection or evasion. The third is worse than the second. To increase the nominal power of arbitrators, and limit the possibility of rejection, is to make the danger of evasion greater than ever. To avoid this worst of all results, there must be some proportion between the theoretical authority and the practical strength which lies behind it.

It is also important that settlements for competitive business, if not for through business of all kinds, should be made, as far as possible, through the medium of the Association. Such a system would not prevent rebates, but it would at least take away a great many of the opportunities which now encourage the giving of rebates. It would make the practice much less easy and much more dangerous.

Interlocking.

In a note concerning the new interlocking at the Grand Central Station in our issue of Nov. 29, we said that in ingenuity in mechanical devices to enconomize room, labor and money, the signal engineers of the United States have outstripped those of England, the home of the art. This fact Mr. Soule made very clear in his lecture before the New England Railroad Club at its December meeting. He said that the work which Saxby & Farmer proposed to do at the Central of New Jersey terminus with 185 levers the Union Switch & Signal Co. does with 66. A comparison of new and old American practice may be seen at the Grand Central Station, where in the reorganization of the plant a saving of about 51 per cent. was made in the number of the levers. Another striking example of modern practice is the interlocking at the

Kansas City Union Station, where 59 switches, with locks and detector bars, 57 signals, 87 indicators and one set of movable frogs are moved by a 36-lever pneumatic machine.

All this is very encouraging. Commercial policy and free competition unrestricted by regulations of any sort have worked steadily in the last 10 years to lower the cost of interlocking, while railroad men and the general public have been becoming familiar with its uses and possibilities. As the demand has grown the cost has fallen, and now it may be said with confidence that henceforth the use of this invaluable aid to speed, safety and economy will spread rapidly. There are now at least four firms in the United States producing interlocking apparatus of a high class, and three of these make this work their most important product. Still other concerns contemplate taking up the manufacture of interlocking apparatus, and we are promised some striking novelties, among which there may be developed radical improvements on mechanism now in use. Those firms which are now extensively engaged in the business have signal engineers capable of skillful work in laying out the tracks and the signaling of the most difficult points. This is an art by itself, and requires special experience, and often demands judgment and ingenuity of a pretty high order. Signal engineers of more or less experience and ability have grown up, too, on many of the railroads. The literature of signaling, and particularly of interlocking, is not very large, but it is so scattered as to be of little use to the student; nevertheless knowledge of the principles and practice of the art is no longer confined to a little group of men who acquired a knowledge of its unwritten traditions from actual work under English engineers. Bright Americans have taken hold of the subject and have, as we said at the outset, in some ways improved on the teachings of the masters, so that it is no longer difficult for railroad companies to get expert work of a high quality in this specialty.

Yet the number of men in this country who are thoroughly well grounded in the principles and who are familiar with the best appliances and practice is comparatively small, and just here comes in one danger of the present sharp competition. It is the danger that with the great inducement to reduce the plant, and consequently the cost, to a minimum there may be imperfect protection, or a sacrifice of simplicity. These errors can only be avoided by firmness on the part of the signal companies and care on the part of the railroads. It is the duty of the former to make clear to their customers the difference between partial and complete protection and to decline to take any responsibility where the protection is not complete. It is the duty of the engineers and officers of the railroad companies who may be called upon to decide between competing plans to inform themselves thoroughly as to the merits and defects of each and to see that when the cheaper one professes to give all the security of the more costly one it really does so. There may be an immense difference in safety and in facility and economy of operation between two systems which ostensibly are the same. An economy in first cost may easily be made in this class of work, and the apparent saving may easily be lost, over and over again, in delays to traffic in an ill-planned yard, or in accidents from imperfect locking, or signaling, or protection of switches.

Adhesion of Drivers and Velocity of Rolling Contact.

Some of our readers will remember that in the *Railroad Gazette*, July 6, 1888, page 444, in an editorial entitled "Slipping at High Speeds," attention was called to an experiment made upon the Northern railroads of France about eleven years ago by M. Rabeuf, an engineer, which seemed to show a slipping of drivers of from 13 to 25 per cent., and that M. Stevart had recently made records of long runs at high speed with coupling rods removed, and found no appreciable change in the relative positions of the crank pins, and from further experiments had concluded that M. Rabeuf's experiments were in some way in error, because no record could be found of any slip whatsoever. In the same editorial there were noticed the experiments of Messrs. Abbey and Baldwin on a Jersey Central express passenger engine on the Bound Brook route, where the slip at high speeds was found to be practically *nil*. We mention this because there is now a revived interest in the matter, and there are railroad men who firmly believe in the existence of such slip, and several designers of locomotives and writers upon allied subjects claim that the coefficient of friction between the tire and the rail is much reduced at high speeds. Recent arguments by these authorities show that they believe it to be possible that locomotive cylinder power at high speeds may be increased to a point where the drivers will slip because of the reduction of the friction between the tire and the rail as the result of high speed.

The records that we now have relate entirely to the slipping of drivers, and not at all to the coefficient of friction. Whether that factor be more or less, there is now no means of knowing. Those who are increasing the cylinder power of locomotives at high speed by improvements in the valves and valve gear, reduction of wire drawing, back pressure and compression, and by increasing the size of the exhaust nozzles and the steam pressure, may do well to consider, among other possible results, the reduction of the coefficient of friction between the rail and the tire at increased speed. This is an unworked field in friction, and but little is known regarding the variation of the friction between surfaces under wide variations of velocity of rolling contact. The variation of friction under variations of sliding contact has been experimented upon by many, and the results are well known, the general conclusion being that the increased speed of sliding contact always brings about a reduction in the coefficient of friction.

It has become evident to some who are called upon to move trains consisting of 14 to 16 coaches that the locomotives have insufficient power at high speed, while fully equal, with a considerable surplus, to the demand for hauling power at low speeds; and those who are careful observers of the time between stations will notice that whenever a train reaches even a slight grade, at 50 miles per hour, it invariably slackens speed, and the runner is powerless to prevent it. The fact is, that the mean effective pressure in the cylinders is generally at or near the maximum which can be obtained before the grade is reached, and there is no surplus to draw upon to surmount the grade and maintain the speed.

The problem of running fast heavy trains has nearly simmered down to the production of a greater mean effective pressure in the cylinders at high speed; but before it is advisable to considerably increase the cylinder power, it is in the line of conservative action to investigate the adhesion of the locomotive in question at the desired speed, to determine if there is sufficient friction between the rail and the tire over and above that now utilized to warrant an increase of cylinder power. A preliminary investigation of this subject on the Burlington has shown that the drivers of the class H engine, when doing regular work, do not slip in the least perceptible degree at high speed, and, therefore, there is reason to believe that, even if the coefficient of friction between the tire and rail decreases with the increase of the velocity of rolling contact, there will still remain sufficient adhesion to warrant an increase of cylinder power without an injurious amount of slipping of the drivers.

The class H engines on the C., B. & Q. have 19 × 24 in. cylinders, 63-in. drivers, carrying 150 lbs. of steam pressure, and have 92,000 lbs. available for adhesion. The new eight-wheel engine on the New York, New Haven & Hartford road have 18 × 24 in. cylinders, 63-in. drivers, carry 180 lbs. of steam pressure, and have an adhesive weight of 54,000 lbs. The ratio of the cylinder power at 85 per cent. of the boiler pressure taken as the mean effective pressure and reduced to the point of contact between the rail and the tire, see *Railroad Gazette*, April 26, p. 271, to the weight available for adhesion is, in the class H engine, 1 to 5.3, and in the New York, New Haven & Hartford engine 1 to 2.9. If the same ratio existed at high speeds between the cylinder powers, there is a greater liability of producing slipping in the case of the New York, New Haven & Hartford engine by a ratio of 18 to 1; and while one of these locomotive may have no perceptible slip yet the other might. If it be that there is not sufficient cylinder power in the New York, New Haven & Hartford locomotive to slip the drivers at high speed, then the class H engine can be increased in cylinder power a large amount with freedom from slipping. These remarks apply as well to other engines than those used on the Burlington, and the subject is worthy of consideration, in connection with the various means of increasing locomotive cylinder power at high speeds, by the Master Mechanics' Association. As we have both the light and the heavy engines running under the same general conditions, it would be worth while to go to the little expense necessary to settle some of the disputed points regarding the different economies and actions between locomotives having small and large ratios of cylinder power to adhesive weight. The apparatus now offered for measuring the speed and revolutions of locomotive drivers is sufficiently well developed to warrant an extended use; and as this apparatus is inexpensive and sufficient for making records of the desired information, there seems to be no good reason why it should not be done. Such records as these from the instruments just mentioned would be of great assistance to those who are contemplating an increase in high speed cylinder power by various changes in designs, and it would be most gratifying to verify what seems now to be evident, but which is not sufficiently well established, *i. e.*, that as far as the propulsion of trains at high speed is concerned, our locomotives are sufficiently heavy upon the drivers, and therefore that we must not look to heavier engines for increased speeds in the future, but rather to better designed locomotives having a higher cylinder power, which practically means a higher mean effective pressure than that which is now obtained and which seldom exceeds 38 lbs. even when the boiler pressure is as high as 180 lbs. per square inch.

Steel in Locomotive Boilers.

We have often heard that there is an increase in frequency of locomotive boiler explosions. Whether there is or not, they are too frequent so long as there are any at all. It is only a few days since that a boiler in a new locomotive exploded just after being put into service. The causes of the explosions are not the same in each case. One of the principal of them is an increase in pressure without necessary changes in design. In not a few cases where the pressure has been changed from 130 to 160 lbs. per square inch, the only change that has been made in the design is in the thickness of the sheets; the effect of the increased vibrations of the sheets due to an increase of pressure being lost sight of. Flat surfaces that will stand without fractures, due to repeated bending, as the pressure varies from below 130 lbs. up to that point, will not stand when the pressure is increased to 160 lbs., even if the plates are made thicker. One of the most disastrous explosions that occurred last year was that of a new locomotive boiler that was made of excellent steel, but whose shape was designed for pressures of 140 lbs. and under, and was not changed when used at 160 lbs. with increased thickness of the sheets.

Perhaps the deterioration of steel under repeated vibrations is too little understood and appreciated. When a locomotive crank pin breaks, showing excellent material, but giving no warning, those in charge of the equipment pronounce against steel as a material for such pins, while the truth may be that the bending to which the pin was subjected was greater than it could bear if often repeated. With iron there seems to be much less difficulty under a continual vibration, and because of this there are yet many able men who cling to it for axles and crank pins, and a few who will still have nothing else for boilers. There is no evidence that soft and tough steel will not stand as many repeated strains as iron, and in the case of stay-bolt steel there is no lack of experiments to show that the number of repeated vibrations through an arc of 120 degrees before fracture is considerably in excess of those that can be withstood by the best stay-bolt iron. However, when threads are cut on these bolts there is less advantage shown by the steel. Also there is little knowledge extant of the comparative action of iron and steel stay-bolt material when the vibrations are each within the ordinary limits of elasticity.

Boiler steel is not uniform—not even the output of the same mill—and common tests, such as are performed on an anvil, are not sufficiently accurate to decide upon differences that are vital, and it is a realization of this fact that has led several railroad companies to critically examine each sheet used, even when purchased from reputable makers under a written guarantee. Two roads have lately, to our knowledge, selected many bad sheets from lots of steel supposed to be good, and which were purchased under conditions which were formerly deemed sufficient to warrant its use without particular examination. This is one of the lines of usefulness in which the mechanical testing laboratories return great advantages for small outlays of money; for it is surely an advantage to know that the steels in locomotive boilers are uniform.

So much for the character of the material; by following the practice of the best roads its uniformity is assured. In the nature of the designs more needs to be done. Too many flat-sided, insufficiently stayed boilers are in use. It is not enough to build a boiler that will stand 400 lbs. per square inch under either a steam or water test—hot or cold—even if the working pressure is to be but 160 lbs., and it would not be enough if the boiler showed no leaks or did not give way under a 600 or 700 lbs. test. What is needed is that the shell is not distorted under those pressures, and who is there who makes a practice of testing the changes of shape under change of pressure? It is true that some experiments have been made in this direction and that the results have been such as to cause a few to insist upon the importance of such

examinations, but the matter seems to have been dropped and lost sight of among the many other duties devolving upon the mechanical constructors of railroad equipment. Does it not appear to be, in view of the tendencies to still further increase pressures, important to make examinations to determine the changes of shape under pressure, particularly with flat-sided wagon-top boilers?

The Chesapeake & Ohio.

The sale of the Richmond & Alleghany to the Chesapeake & Ohio was completed this week. This is simply the consummation of an agreement made in August, 1888, in virtue of which the two roads have been operated as one. Not the least valuable part of the property which the managers of the "Big Four" have acquired during the past year consists of the Richmond & Alleghany route over the mountains. The last report of the Chesapeake & Ohio gives a detailed account of this line, with profiles in full. The contrast with the old line, via Charlottesville, is very great indeed. While the latter abounded in steep grades, and had to cross several subsidiary summits, the new line avoids the latter evil altogether and greatly reduces the former. The total amount of ascent and descent is much lessened; the maximum gradients are smaller, and are so distributed that auxiliary locomotive power can be used to the best advantage.

In the future, the line via Charlottesville is to be used chiefly for passenger traffic, especially that to and from Washington. Only local freights will be run over it. The Richmond & Alleghany will be treated as a link in the main line for through freight. This will make it possible to handle trains under vastly better conditions than could have been obtained two years ago. Taking the line as a whole, we find that, east bound, the maximum grade between Covington and Russell, 140 miles, is 13.6 ft. to the mile. Between these points, a ten-wheel engine, weighing 50 tons, will haul 1,000 tons of freight. From Russell to Scary, 57 miles, the maximum grade is practically 30 ft. to the mile, between which points it is proposed to use engines of the consolidation type weighing 130,000 lbs., which will be capable of handling a train of 1,000 tons between the points mentioned. Scary to Hinton, 109 miles, the maximum grade is 21 feet to the mile. On this district, it is proposed to use the lighter class of consolidation engines weighing 106,000 lbs., which will be capable of handling trains of equal weight to those handled by the heavy consolidation engines east bound over the Russell and Scary district. From Hinton to Clifton Forge, 80 miles, the maximum grade is 30 feet to the mile; 130,000 lbs. consolidation engines will be used, which, with the aid of a helper between Ronceverte and Alleghany (17 miles), will be able to deliver at Clifton Forge a train equal in weight to the trains handled over the districts between Covington and Hinton. By the proposed utilization of the motive power, a freight train, weighing 1,000 tons, can be handled solid from Covington, Ky., to Clifton Forge, Va. Over the districts of the James River Division, from Clifton Forge to Gladstone, 111 miles, and from Gladstone to Richmond, 121 miles, a train of fifty loaded cars, or an estimated load of 1,125 tons, can be handled by a ten-wheel engine, weighing fifty tons, and a consolidation engine, weighing 130,000 lbs., will take the train solid from Richmond, Va., to tidewater. The adverse grade of thirty-eight feet to the mile on this district can be modified at a comparatively small cost, so as to make it nominal.

The grades from Fort Monroe, Va., to Alleghany, W. Va., west bound, are considerably in excess of the grades east bound; but owing to the fact that the traffic west bound between these points will consist to some extent of empty coal cars returning to the mines, the power will be about equalized. The power going east with trains of loaded cars will be amply sufficient to handle the lighter traffic west bound.

From Fort Monroe to Richmond the maximum grade is 42 ft. to the mile. On the divisions from Richmond to Clifton Forge there are maximum grades of 50 ft., but only for very short distances, a few hundred feet at a time. Between Clifton Forge and Alleghany (the summit of the mountains), the maximum grade is 60 ft. to the mile; but the number of coal cars returning empty will equalize the power needed. From Alleghany to Scary there will be a surplus of power west bound; but beyond that point the west-bound shipments of coal and lumber will again equalize matters.

It is obvious that the road is to be operated under entirely different conditions from those which have prevailed in the past. Of course, much remains to be done before the road reaches the best operating standard. With the limited net revenue available at present, and the necessary economy in the use of capital, the relaying of the track goes on but slowly. Yet nearly all the bridges on the main line have been rebuilt of iron, and many old trestles have been filled. The fact that the company is using 75-lb. steel in the parts of the track which it relays shows the kind of business it is arranging to do.

December Accidents.

Our record of train accidents in December, given in this number, includes 90 collisions, 67 derailments and 11 other accidents; a total of 168 accidents, in which 52 persons were killed and 174 injured.

These accidents are classified as follows:

COLLISIONS:		
Rear	50	
Butting	25	
Crossing and miscellaneous	15	
		— 90
DERAILMENTS:		
Broken rail	2	
Loose or spread rail	3	
Broken bridge	4	
Defective switch	1	
Defective frog	2	
Broken wheel	1	
Broken axle	6	
Broken truck	3	
Broken brake-beam	2	
Misplaced switch	3	
Rail out for repairs	1	
Open draw	1	
Bad switching	1	
Cattle on track	3	
Landslide	1	
Accidental obstruction	1	
Malicious obstruction	1	
Unexplained	31	
		— 67
OTHER ACCIDENTS:		
Boiler explosions	2	
Broken parallel or connecting rod	1	
Miscellaneous	8	
		— 11
Total number of accidents		168

The causes of collisions, where given, were as follows:

	Rear.	But-ting.	Crossing and other.	Tot'l.
Trains breaking in two	6	..	..	6
Misplaced switch	4	5	..	9
Failure to give or observe signal	4	2	1	7
Mistake in giving or understanding orders	..	1	..	
Miscellaneous	11	5	2	18
Unexplained	25	12	12	49
Total	50	25	15	90

A general classification shows:

	Collisions.	Derailments.	Other.	Total.	P. c.
Defects of road	..	12	..	12	7
Defects of equipment	6	12	8	26	15
Negligence in operating	35	6	1	42	25
Unforeseen obstructions	..	6	2	8	5
Unexplained	49	31	..	80	48
Total	90	67	11	168	100

The number of trains involved is as follows:

	Collisions.	Derailments.	Other.	Total.	P. c.
Passenger	33	21	5	59	23
Freight and other.	141	46	6	193	77
Total	174	67	11	252	100

The casualties may be divided as follows:

KILLED.	Collisions.	Derailments.	Other.	Total.	P. c.
Employés	22	21	1	44	85
Passengers	..	6	..	6	11
Others	1	1	..	2	4
Total	23	28	1	52	100
INJURED.					
Employés	90	27	5	122	70
Passengers	16	29	3	48	27
Others	1	3	..	4	3
Total	107	59	8	174	100

The casualties to passengers and employés, when divided according to classes of causes, appear as follows:

	Pass. killed.	Pass. injured.	Emp. killed.	Emp. injured.
Defects of road	6	5	4	9
Defects of equipment	..	17	3	4
Negligence in operating	..	19	28	95
Unforeseen obstructions and maliciousness	..	3	2	4
Unexplained	..	4	7	10
Total	6	48	44	122

Thirty-two accidents caused the death of one or more persons, and 50 caused injury but not death, leaving 86 (51 per cent. of the whole) which caused no personal injury worthy of record.

The comparison with December, 1888 and 1887, shows:

	1889.	1888.	1887.
Rear collisions	50	25	51
Butting "	25	32	36
Crossing and other collisions	15	7	5
Derailments	67	61	83
Other accidents	11	11	7
Total "	168	136	182
Employés killed	44	41	57
Others "	8	5	14
Employés injured	122	73	87
Others "	52	63	124
Passenger trains involved	59	56	79
Average per day:			
Accidents	5.42	4.39	5.87
Killed	1.68	1.48	2.29
Injured	5.61	4.39	6.80
Average per accident:			
Killed	0.309	0.338	0.390
Injured	1.035	1.000	1.159

The worst disaster of the month was that at White Sulphur Springs, Va., on the 28th. There is no record of any other which caused the death of a passenger. The train in this case was heated by steam from the locomotive and lighted by electricity from a dynamo in the baggage car. The satisfaction afforded by these features was pronounced on the part of both the railroad officers and the passengers, and has been intelligently commented upon by many newspapers. The press reports of this accident contained alleged statements of passengers to the effect that the track was in a very bad condition; but the officers of the road say that the rail was but slightly worn and that the sleepers, so far from being decayed and worthless, are still in the track. The break in the rail was clean cut and there was no evidence of flaw or other defect in the metal. The butting collision near Kokomo, Ind., on the 31st was just beyond a junction where one of the trains should have waited until the other arrived and passed off the main line. It was *assumed* that the opposing train *had* thus passed off. The conductor and engineman are both said to have been "old and reliable." The instance would seem to indicate that a test should be applied occasionally to see if even old and reliable men do not sometimes fall into the habit of omitting the examination of the register, or of reading it carelessly, or of trusting to each other to do that which the rules require to be done by each seperately. A rear collision on the steep Altoona grade of the Pennsylvania, on the 27th, was in some respects as remarkable as that in the same locality Nov. 8. It was really a series of four collisions. It should not require many cases of this kind to sharply bring up the question of an absolute block system for all trains, with switches to throw trains off the main tracks at every block station. A derailment on the Ohio, Indiana & Western on the 16th had the remarkable result of killing two officers of the road and no one else. We assume that they were on duty, and have classed them as employés. The startling disaster at Little Ferry, N. J., the 14th, was somewhat peculiar in that there were three men on the engine any one of whom ought to have seen the danger signal, indicating that the draw was open; but all three were killed, and the cause of their heedlessness is unexplained.

At Yreka, Cal., some section men on a hand car ran into a loaded gravel car with sufficient force to kill two of the men. This was a collision, and a disastrous one, but is not a train accident, and is mentioned here simply as an instance of the innumerable opportunities for killing people on a railroad. Near Portland, Conn., Dec. 1, some section men who were carrying rails across the main track paid too little heed to an approaching train, and found it upon them while a rail still obstructed the track. By superhuman efforts, forgetful of their own safety, three of them succeeded in getting the rail clear of the train; but they were themselves struck and thrown down an embankment, and two of them were killed.

A Winnipeg dispatch of Dec. 12 gave some particulars of the derailment of a passenger train on the Canadian Pacific, in the mountains on the western section of that road, where one passenger car, with its imprisoned passengers, hung over a rocky precipice of great height and with almost perpendicular sides, for two hours, while the trainmen built a staging to support the car. It would have fallen several hundred feet except for the strong couplings which held it to the engine and other cars remaining upon the roadbed.

A Need in Railroad Accounts.

The English system of accounting requires that experts shall certify to the correctness of a railroad's figures and that a dividend has been earned, before any payment to shareholders shall be made. Such an association of accountants was formed in America for examination of railroads here, but the English plan has been adopted by but few of our roads. The questions required to be answered by investors are not the same here as in England. English traffic conditions are comparatively simple. In America the stockholder asks not so much about the charging up of money spent as to the need of spending it. Evidently a man may be an expert bookkeeper, and yet if he is not practically acquainted with railroad affairs in general and with the conditions of transportation on the railroad in question in particular, his assertion that the railroad books balance will be of little practical use to his employers. Is the rolling stock running down or the maintenance of way scrimped, in order to make a showing of dividends? An association of mere accountants could hardly be expected to throw much light upon such questions.

There is all the more reason, then, for such a plain and simple report at the end of the year, that the real condition of the company can be ascertained by any one. Technical bookkeeping may hinder rather than help the investor even where nothing is hid. Take the Reading corporations. The railroad company and the coal company are distinct, but as the former owns the latter, great care should be taken with their interlacing accounts. There is a question whether a coal carrier ought to go outside to buy coal lands, but there is none that the Reading paid in bonds extravagant sums for its coal estate, estimated at one-third the entire anthracite deposits in Pennsylvania.

Now, in its report for the year ending Nov. 30, 1888, the Coal & Iron Company shows a profit from mining of only $28,650, and, after deducting its bonded interest, a net loss of $806,221. One naturally asks how this loss was carried. No item of the kind appears in the railroad income account (technically correct, of course). In the railroad general balance sheet appears the enormous item of $72,615,374, representing the value of the railroad's investment in the coal company. In the report for the previous year the bonds and indebtedness of the coal company to the railroad company were itemized. Adding these together, we find that the total was increased in 1888 by twelve hundred thousand, of which the eight hundred thousand loss was part. Thus the losses of the coal company become an asset upon the books of the railroad company (technically correct again). On the credit side of the railroad balance sheet we find the "suspense account," which must mean floating debt, correspondingly increased.

Now it is a fair question, how is the ordinary investor to find all this out? The income account of the railroad company shows a paper profit from transportation of $2,250,322, which was paid on the income bonds as contin

gent interest fairly earned. Besides the $800,000 loss of the coal company mentioned, there was $500,000 more charged to capital account for dead work in the collieries, which all mining engineers are agreed is as much chargeable to operating expenses as miners' wages. Admitting the technical correctness of the bookkeeping and that there was no intention to deceive (as undoubtedly is true), there remains the question, what simple check upon such complicated accounts can there be, which will enable the average investor to see, even if but faintly, the true results of the year's operation of his property? Such a check would be the publication in each railroad's annual report of a condensed statement of the treasurer's cash transactions for the year. This should show with sufficient fullness the source of each cash receipt and the nature of each cash disbursement. If we suppose such a treasurer's report in the Reading case mentioned, it would at once have shown that the year's expenses exceeded the receipts, and that the treasurer had to borrow the money or sell bonds to pay for such deficit. Then afterward the stockholder could find out for himself where the deficiency was carried in the bookkeeping. There are cases where the deception is willful and there are others where no technical fault with the accounts can be found. But in either case, the treasurer's cash account would do no harm if published.

A very important bill was introduced in the New York State Senate this week, the object of which is to provide for New York city more adequate means of internal communication, that is, to extend and increase the "rapid transit" lines. The bill names the Commissioners, and it appears to be generally accepted that the interests of the public will be safe in the hands of the men named. The Commission is given power to determine routes and the general plan of construction, but by the terms of the bill no routes may be established on Fifth avenue, Madison avenue, Fourth avenue above Forty-second street, Broadway below Thirty-third street, and all streets and avenues now occupied by elevated roads, except that an underground road in Broadway is not prohibited, and that thoroughfare and those occupied by elevated roads may be crossed at any point that may be deemed necessary. The routes may not include public parks and lands occupied by public buildings. Otherwise the Commissioners will be empowered to lay routes pretty nearly everywhere in the city, and to select elevated, surface or underground systems. The approval and consent of the aldermen must be had. The rights and franchises to be granted in carrying out the plans of the Commissioners must be sold at public auction, and the Commission is given very wide powers to fix the conditions of sale and the requirements to be imposed upon the corporations buying the franchises. One very important provision of the bill is that which applies to the elevated roads now running. It is, in substance, that the Board may, upon the application of any railroad owning or actually operating a railroad within the limits of the city, authorize such company to lay additional tracks on any portion or on the whole of its routes; to acquire terminal and other facilities necessary for the accommodation of the traveling public on any street or place on which such railroad shall be located; the Board to fix and determine upon the location and construction of such connections, tracks and facilities, the times within which they shall be constructed, the compensation to be made to the city, and such other conditions and requirements as to the Board shall seem to be just and proper for the protection and benefit of the city. In this direction the Commissioners may doubtless do a great and almost immediate service to the city, for the elevated roads could be greatly increased in capacity if the company was warranted and protected in adding to its present tracks and terminals. On the whole, this movement is the most rational and the most hopeful that has been made in the interest of rapid transit for New York city. The best evidence that it is for the public interest is found in the "enemies it has made"; but in the complicated condition of politics it would be idle to prophesy as to its outcome.

Press dispatches for the past week have contained long accounts of an unprecedented snowfall and blockade of trains on the Central Pacific, and also similar trouble, scarcely less severe, on the Oregon & California line. Trains on the Northern Pacific and Canadian Pacific main lines and on the Oregon Short Line have also been badly delayed. The Denver & Rio Grande and other roads in Colorado were also badly blockaded last week, some trains being delayed seven days. The trouble on the Central Pacific is in the Sierra Nevada Mountains in the vicinity of Truckee, Emigrant Gap and Reno. The trains all reached stations in safety, but many of them were delayed over a week, and provisions had to be conveyed by men on snowshoes in a number of cases. The snow is 3 ft. deep on a level, and many of the reports indicate much more than this, while drifts of 10 ft. are the minimum. In cuts, 30 to 60 ft. is frequently mentioned. Engines by the dozen are attached to plows, but make little headway, and shovelers by the hundred have had their work constantly undone by fresh falls of snow. It appears that snow had fallen sufficiently to block the roads as far back as the 7th, and the extraordinary detention of trains is caused by a heavy fall on top of a considerable depth already on the ground. The aggregate is said to be greater than in 1852, which was the most remarkable year previously recorded. It will be remembered that certain snowsheds on the Central Pacific which were burned during the past year were not rebuilt, the company having determined to try the experiment of keeping the road open with the rotary plow. The rotary "worked wonders," according to the statement of one of the superintendents. At Cascade, along the exposed section of a mile and a quarter, where the snowsheds were burned last summer, there had been 48 hours of hard snowing up to Jan. 11, sometimes as much as five inches an hour, besides heavy drifting. "The bank was piled up to an incredible height, but the rotary went through the mass, cutting a deep channel for trains to pass through without a hitch or stop, and dashed the snow through the hopper 150 feet away from the track." But the later snow filled up this cut and and even the rotary met its match. The sides were so steep and so high (40 ft,) that it was impossible to throw the snow over them and it fell back upon the track. There was a prospect that the road would be open by to-day (Friday.

The Governor of Nebraska has addressed an open letter to the general managers of the Burlington, the Chicago & Northwestern, the Missouri Pacific, the Union Pacific, the Rock Island, and the Chicago, St. Paul, Minneapolis & Omaha railroads, urging them to put into effect a rate on corn at least five cents per 100 lbs. lower than that now in force. Corn sells at such a low price, and the supply is so great, that producer, carrier, or wholesaler must suffer. The Governor thinks the carriers should assume a larger share of the burden than they now bear. On the other hand, the carriers have more business than they can attend to with prices as they are. This, however, is partly owing to lack of cars or terminal facilities, or both, and the roads are probably getting rich no faster than their Kansas neighbors, whose poverty-stricken condition was shown in our last issue. The Chicago, Burlington & Quincy announces that it will not hereafter accept grain to be delivered on the side tracks of other railroads in Chicago. This indicates that the anxiety of the road to secure business is not remarkably intense. Other roads are still worse pressed with traffic, and on many of them this condition has existed so many weeks, that from any rational point of view they ought to increase their rates; but the mere idea of such an unusual move suggests such unknowable possibilities that no traffic officer has the courage to make it. It is simpler (in the traffic department, if not on the road) to let the freight movement stop from sheer clogging. The eastbound shipments from Chicago last week were 113 per cent. greater than those of the corresponding week of last year, and within 4,000 tons of the record for the week ending January 11, which was 131,793 tons, and by far the heaviest ever known. The pressure of traffic resulting from the enormous shipments of corn is felt even on the Canadian Pacific, which has engaged to transport 10,000 cars or more to the Atlantic seaboard, most of it going to Boston. The Soo Line is indeed a very lively reality. The unusual number of freight trains on the Canadian Pacific has resulted in considerable delays to passenger traffic.

A member of the Massachusetts Legislature has introduced a bill providing that the members shall be furnished with railroad transportation to and from the Capital by the Secretary of State, presumably from state funds. This is substantially the scheme embodied in a law by the Connecticut Legislature last February; there the member turns his mileage allowance into the treasury and the treasurer is to pay out of the public funds whatever may be necessary above that. Members are free to take advantage of this law or not as they may see fit, but the roads are forbidden to carry them cheaper than they do other people except through the state treasurer's tickets as prescribed. The law has not yet had a chance to show its merits. The Boston *Herald* takes the present occasion to offer some reflections on the general subject of railroads' influence over legislators, and concludes that, although the proposed scheme is not by any means a desirable ideal, it would probably be effective in removing the sense of obligation to the railroad on the part of the legislator when he receives a pass directly from an officer of the road. The general fact that, with legislators as they are, the interests of the public often suffer when those of a railroad company come into conflict therewith, is recognized and deplored, but no remedy is proposed for it. That the use of passes by public officers is a matter of interest in more than one locality is indicated by the publication in a Chicago paper of a list of names, in small capitals, of judges of state and federal courts who do accept passes, and another of those who do not. The lists are evidently based on interviews with the officials themselves.

The Chicago, Burlington & Quincy has revised its rule prohibiting intemperance, making it very stringent, and much more definite than is generally the case with regulations of this kind. Agents, trainmen, engineers, and telegraph operators are warned to keep away from saloons if they desire to remain in the employ of the company. Drunkenness, either on or off duty, is made a cause for discharge. When it is the first offence superintendents and master mechanics may use their discretion; but in the case of a second offence the offender must be discharged. No person thus discharged can be again employed without the consent of the General Manager. The reader need not to be reminded of the recent sad instance of misplaced leniency which furnished a startling argument for the existence and enforcement of a rule of this kind. It is to be hoped that, not only on the Burlington, but on every other road, the officers of every grade will have the courage and firmness to carry out the principle embodied in the rule. Abstractly, there may be volumes of argument against rules which technically infringe the employé's rights when he is off duty, but, practically, a railroad manager must have men in whom he can feel confidence. Without this he might as well repair to an insane asylum at the outset. And as the interest and reputation of the employé himself are involved in the degree of satisfaction he gives his employer, the restrictions imposed are just as practically for his own benefit as for that of the railroad company albeit they may be called "despotic."

The Osceola, the boat which is to run between Manitowoc, Wis., and Ludington, Mich., making a freight line between the Northwest and the East, via the Green Bay, Winona & St. Paul and the Flint & Pere Marquette railroads, went through the Straits of Mackinaw on the second of January, that passage having not yet frozen over. This a rare event in lake navigation. The boat will be kept on its route all winter if not prevented by severe weather. The eastern outlet of the Green Bay, Winona & St. Paul at Green Bay has always been unsatisfactory, as access to deep water from that point is impeded by a long and somewhat crooked channel dredged through a mud flat. As deepening this channel is an increasingly expensive operation, other ports find influence to offer an increasing opposition that results in keeping Green Bay with from two to three feet less navigable depth than its more fortunately situated rivals, and it may be expected that Manitowoc will became the chief eastern port of the road named. The Osceola, which stopped at East Tawas and took on a cargo of salt, will, after discharging her cargo at Milwaukee, go into Wolf Davidson's dry dock at that place and be heavily plated with iron to protect her hull from the ice which is expected to form in Lake Michigan.

The Chicago, Burlington & Quincy has adopted for the front of its engines the coupling arrangement common among the coal roads of Pennsylvania and elsewhere. The engines have heretofore been equipped with the ordinary long drawbar or "stiff shackle" at the front end for pushing and pulling cars, but owing to the number of accidents and to various inconveniences, it has now been decided that all locomotives when passing through the shops for repairs shall be equipped with a "bull nose." This consists of a wrought iron drawhead held in position by wrought iron braces, and extending forward to meet the drawbar on the cars. It is coupled in the ordinary way with the link. With this device a short pilot is used in order that the point may not come in contact with brake beams of cars. In pushing the heavy trains now common, and which an engine may encounter daily, the weakness of the old-fashioned long coupling is a constant source of trouble, whereas a properly braced draw-head set 15 in. forward of the buffer beam makes the strength of this part as fully equal to its requirements as that of any portion of the engine.

A number of bad train accidents have occurred during the past week, two or three of them to passenger trains. On the Cincinnati, Hamilton & Dayton, near Cincinnati, on the evening of the 17th a local passenger train was run into at the rear by a fast express drawn by the heavy Strong locomotive, and five persons were killed. The local train had a baggage car at the rear end. If the train had been made up in the usual way the deaths would undoubtedly have been much more numerous. The reports indicate that a block system was in use on this portion of the road, but that a station operator, only 17 years old and of no great experience, pulled down the signal before receiving "line clear" from the next station. At Omaha, on Tuesday morning, a number of passengers were badly injured and one or more killed by a freight running into the rear end of a passenger train. The freight train had broken in two, and the engineer was running as fast as he could to keep out of the way of the rear portion. A collision on the Chicago, Burlington & Quincy at Stanton, Iowa, on Wednesday is reported to have killed several persons, but no details are given.

The committee appointed by the Western Railway Club at its December meeting to consider the question of the advisability of joint car inspection held a meeting on Tuesday morning last. Twenty-two roads were invited to send representatives, but only ten were present. After a considerable discussion a vote was taken, the result of which showed two in favor of joint inspection and eight against it. As a result, a committee was appointed to report on the feasibility of adopting a red card system the same or similar to that used by the Chicago & Northwestern as described by Mr. Schroyer before the Western Railroad Club at its December meeting. This committee is ordered to report one month hence.

The St. Paul, Minneapolis & Manitoba and the Canadian Pacific have made one more move on the checker-

board of passenger competition by upholstering their second-class sleeping cars and throwing them open to passengers holding first-class tickets. These cars are run daily betweeen St. Paul and the Pacific Coast, the charge for berths being $3. The *free* sleepers, which are distinguished from those first mentioned by being called "colonist" instead of "tourist," run weekly and are not upholstered. These also take first-class passengers.

NEW PUBLICATIONS.

Report of the Internal Commerce of the United States for the Fiscal Year 1889. Part II. of Commerce and Navigation. By William F. Switzler, Chief of the Bureau of Statistics, Treasury Department. Government Printing Office, Washington, 1889.

The volume treats of the commercial, industrial, transportation and other interests of Arkansas, Colorado, Dakota, Indian Territory, Kansas, Missouri, Montana, Nebraska, New Mexico, Texas and Wyoming.

In the February issue of *Scribner's Magazine* will appear the first of two papers on John Ericsson, written by Colonel W. C. Church, who is preparing a biography of Ericsson. Colonel Church has had placed at his disposal a vast quantity of unpublished letters and notes, as well as drawings. In the *Scribner* articles will appear diagrams never before published, showing some of Ericsson's earliest designs for the Monitor and for methods of naval attack.

TECHNICAL.

Locomotive Building.

The Central of New Jersey has placed an order with the Baldwin Locomotive Works for five passenger and 11 freight engines.

The Brooks Locomotive Works, of Dunkirk, N. Y., have recently completed several new engines for export to Cuba.

The Louisville & Nashville has ordered 20 engines from the Rogers Locomotive Works, of Paterson, N. J. Ten are to be consolidation engines and 10 switching.

Car Notes.

The Jackson & Sharp Co., of Wilmington, Del., has received the contract for 12 passenger cars for the New York, Ontario & Western.

The Missouri Pacific is in the market for 3,500 freight cars.

The Ohio & Big Sandy has 30 gondola and 100 coal cars building at the Ensign Car Works, Huntington, W. Va.

The West Virginia Central is receiving a large number of 60,000-lb. drop-bottom gondola cars for its coke, coal and lumber traffic, from the South Baltimore Car Works, at the rate of eight a day.

The New York Central & Hudson River road has within a few months added 50 new standard coaches, heated by steam and lighted by the Pintsch system, to its passenger equipment.

The Baltimore & Ohio has received two new sleeping cars from the Pullman Palace Car Co. for service between Baltimore and Pittsburgh. The cars have several new improvements.

The Pennsylvania has completed at the shops at Altoona six chair cars, for use on the Camden & Atlantic line.

The Wason Mfg. Co., of Brightwood, Mass., has a contract to build six passenger cars, each seating 50 people, for the new Pike's Peak rack railroad.

Three parlor cars are to be built for the Intercolonial. The contract is to be given to a private firm.

Stillwell, Millen & Co., of Savannah, Ga., have recently let a contract for 100 cars, for carrying lumber.

The Ohio Falls Car Co., of Jeffersonville, Ind., at present employs 2,500 men. Last year the company built 2,810 freight cars and 110 passenger cars. During the first two months of the year no freight cars were built.

Bridge Notes.

Shailer & Schniglau, of Chicago, Ill., have the contract for constructing the bridge of the New Orleans, Natchez & Fort Scott across the Tensas river at Sicily Island, 25 miles from Vidalia, La.

The Smith Bridge Co., of Toledo, O., has been awarded the contract to build the superstructure of the iron bridge at Oak street, Toledo, for $7,900. The bid for the whole work was $8,953. The King Iron Bridge & Manufacturing Co., of Cleveland, bid $9,300 and the Massillon Bridge Co., of Massillon, O., bid $9,500, both bids being for the whole structure.

The contract for the superstructure of the Rock Ford Crossing bridge, near Fort Worth, Tex., has been let to Oliver & Bros., of Houston, Tex.

The contract for building an iron bridge across Kickapoo River at Walnut Ford, Ill., has been let to the Massillon Bridge Co., of Massillon, O., for $1,260.

The city engineer of Rockford, Ill., is preparing plans for a combination-deck bridge over the Rock River, from Morgan to Bluff street, and a plate girder or through bridge at State street.

The South Park Bridge and Bolt Works, of St. Paul, have been awarded the contract for the wrought-iron work on the Neihart extension of the Montana Central.

A project to bridge the Mississippi River at Burlington, Ia., by a wagon and railroad bridge has been revived recently.

The San Francisco Bridge Company will shortly commence the erection of the iron drawbridge of the Seattle, Lake Shore & Eastern over the Stillaganmish River. The bridge will cost about $30,000, including approaches.

The contract for building the Montgomery, Tuskaloosa & Memphis bridge over the Cahaba River, near Centreville, Ala., has been let to Carter Brothers, of Louisville, Ky.

The piles for the winter bridge of the Pacific Short Line across the Missouri River at Sioux City, Ia., have all been driven and the bridge will be opened this week.

The Wilmington & Weldon is constructing an iron bridge at Greenville, S. C., with a draw span of 126 ft. The trestle approaches are 1,700 ft. long, and they have been nearly completed.

The Lake Shore & Michigan Southern has decided to replace its present bridge at Huron, O., with a double-track bridge.

The Central Vermont proposes to build a new draw-bridge over the outlet of Lake Champlain, at Rouse's Point, N. Y., to replace the one now in use.

The Dunkirk, Allegheny Valley & Pittsburgh is to build an iron bridge over the Connewango River, near Frewsburg, N. Y.

The City Council of Akron, O., has directed the city engineer to prepare plans for a viaduct over West Market street.

The County Court at Memphis, Tenn., has awarded the contract for an iron bridge across Hatchie River to J. B. Diver & Co. for $4,990.

Manufacturing and Business.

The Joseph Dixon Crucible Co., of Jersey City, issues a a statement showing a large increase in its 1889 business, over that of the previous year, in all departments, including the paint, lubricants, pencils and other articles, of which the graphite from the company's Ticonderoga mines is a component. The plant now includes five steam engines with a total of 375 H. P.; nine steam boilers of 600 H. P. together, and the use of 150 H. P. water power. The company employs 550 persons and the pay role averages $4,500 per week.

The Springfield Iron Co., of Springfield, Ill,, has recently sold the receivers of the Missouri, Kansas & Texas about 1,600 tons of splice bars, and the Denver & Rio Grande about 1,000 tons of splices, for 1890 delivery. The Springfield mill now has probably the largest capacity in America for making railroad splice bars. The company has made and shipped 4,500 tons in one month. It now has five trains of rolls running night and day on merchant iron and splices.

The Marden Car Brake Co., of Boston, is filling an order for 1,000 of the Marden steel brake beams, for the Lafayette Car Works, of Lafayette, Ind.

The Metallic Grain Door Co., of Detroit, Mich., has recently supplied 500 metallic grain doors to the Michigan Central, and it has also received a number of smaller orders from other roads.

The Midland Construction Co., of Chicago, has been chartered in Illinois to build and equip railroads. The capital stock is $10,000, and E. L. Waugh, C. W. Needham and others are incorporators.

A large stationary boiler has been built by P. P. Morris & Co., of Port Richmond Iron Works, Philadelphia. It is one of several constructed for the Calumet & Hecla Mining Co., of Calumet, Mich., and is said to be the largest stationary boiler in the United States. One of these boilers is now supplying ample steam for a compound engine of 750 indicated H. P., and it is estimated that with a pressure of 180 lbs. a triple expansion engine will get 1,000 H. P. out of it. The boiler is 34 ft. 4 in. long, 7 ft. 6 in. in diameter, 9 ft. 2¼ in. wide and 9 ft. 2¼ in. high. It contains 199 tubes of 3 in. diameter and 16 ft. long, and its total weight is 33 tons.

A charter has been granted in Pennsylvania to the Pittston Car Wheel Co., with a capital of $20,000. The directors are J. W. Mosier, J. K. Sax, W. Griffith, E. G Mercur, of Pittston, and L. B. Hilliard, of Wilkesbarre.

The American Flush Door Co. is the name of a company incorporated in Indiana last week. H. R. Duval, of New York City, is President; J. L. Wagner, of Terre Haute, Vice-President, and Charles Lewis, of Indianapolis, Secretary and Treasurer.

Iron and Steel.

The Peoria Rolling Mill Co., of Peoria, Ill., has been recently incorporated with a capital of $200,000. Charles P. King is President; H. C. Carrick, Vice-President; C. H. Mosher, Secretary, and Thomas Gogin, Manager. The reconstructed plant will be composed of four double puddling furnaces, seven heating furnaces, eight trains of rolls and one 2½-ton hammer.

The Passaic Rolling Mill Co., of New York City, has completed its new open-hearth plant, which consists of two 20-ton furnaces with blooming mill, thus doubling the capacity of the works.

Carnegie, Phipps & Co., Limited, of Pittsburgh, are remodeling the rod mill department of their Beaver Falls mill, with a view of increasing its capacity. William Tod & Co., of Youngstown, O., are building 2,500 H. P. engines for the mill.

Extensive improvements are being made by the Clinton Iron & Steel Co., of Pittsburgh, including the erection of seven new puddling furnaces and a battery of boilers.

The large anthracite blast furnace at Temple, Berks County, Pa., which has been idle for a number of years, is to be put into blast at once. George F. Baer is President of the company which will operate the furnace.

The annual meeting of the stockholders of the Solid Steel Co. was held at Alliance, O., Jan. 15. The report of the company showed a very gratifying increase in the growth of business during the past year, and the prospects for 1890 are flattering. The following directors were elected for the ensuing year: J. K. Bole, S. J. Williams, G. W. Roepper, S. T. Wellman and L. A. Roby. The latter is Superintendent of the Otis Steel Co., and succeeds T. R. Morgan, Sr. J. K. Bole was elected President; C. W. Roepper, Superintendent; S. J. Williams, Treasurer, and W. A. Blanchard, Secretary.

Hopkins & Co. will erect a new rolling mill at Catasauqua, Pa. The plant will have 13 puddling, two scrap and two heating furnaces, with a capacity of about 1,000 tons of guide and merchant iron per month.

The stockholders of the Tudor Iron Works, of St. Louis, held their annual meeting last week and chose as directors for the ensuing year T. A. Meysenburg, G. S. Edgell, G. O. Carpenter, Jr., F. W. Oliver and B. S. Adams. The capital stock was increased to $500,000.

The Rail Market.

Steel Rails.—The Board of Control report for Jan. 1 shows that up to that date the total sales of rails by the mills in the association, for delivery in 1890, aggregated 746,895 gross tons. It is the impression, however, that the sales really have been considerably larger. The allotment was 1,060,000 tons. No large sales have been reported, but the market continues firm and quiet. Eastern mills generally quote $35. Some of the mills in Eastern Pennsylvania are asking $36. At Pittsburgh $35@$36 are the quotations, and at Chicago rails are held at $37@$37.50.

Old Rails.—Quotations are: At New York, $28.50 for tees and $29 for double heads; at Pittsburgh, $28.50@$29 for old iron rails and $24@$24.50 for old steel rails; at Chicago, $26.50 for old iron rails and $20.75@$21 for old steel rails.

Notes.

The Lehigh Valley proposes to enlarge the freight transfer house on the land known as the Tifft Farm, near Buffalo, by building an extension 1,000 ft. long and 127 ft. wide. The plans are being prepared, and it is expected the building will be finished ready for the opening of navigation in the spring.

The Norfolk & Western has let the contract for a second pier, 800 ft. long and 150 ft. wide, at Lambert's Point, Norfolk, Va. The creosoted piles are now being put in. An iron warehouse will be built and will cover the entire pier, and have double tracks running its entire length. Cofrode & Evans have the contract for the first warehouse pier. This is the larger of the two, being 765 × 190 ft., with 920 ft. of bulkhead.

Artificial Stone for Railroad Purposes.

A recent circular of the Wehn Pavement Co. states that the Pennsylvania Railroad and the Pennsylvania Company have put down over 1,000,000 sq. ft. of the "Lithogen" pavement made by the Wehn Company. It is used for station platforms, shop and station floors, in roundhouses, etc. It is suggested by the company also that in many cases ditches could be profitably paved by this method, particularly in wet cuts. Both concrete and asphalt pavements are made. The cost of the Lithogen pavement varies, of course, according to the conditions, but a fair average price is $2.25 to $2.50 per square yard. There appears to be a considerable increase in the use of pavements of concrete or of asphalt in railroad work, and many engineers who have not used pavements heretofore are investigating the subject.

Burton Stock Cars.

The Burton Stock Car Co. is building at its works at Wichita, Kan., 12 of the hood pattern stock cars for private use. The old equipment is being taken into the shops for a thorough overhauling, repairing and repainting.

An arrangement has recently been completed with the Pennsylvania by which the perfected palace horse cars of the Burton Stock Car Co. will run on passenger trains between New York and Chicago. The cars will be operated by the Adams Express Co. When no horses are shipped the partitions are removed and cars utilized for express freight.

Another Automatic Coupler.

Tests of the Ford & Whitworth automatic coupler were made Jan. 20 on the tracks of the Illinois Central at Jackson, Miss. It is intended for freight cars only.

RAILROAD LAW—NOTES OF DECISIONS.

Powers, Liabilities and Regulations of Railroads.

In Vermont, the Supreme Court decides that where land has been acquired by one railroad company under the right of eminent domain, it cannot, in the absence of express or necessarily implied statutory permission, be taken by another company, to whom it would be convenient, but not necessary.[1]

In Missouri, the Supreme Court holds that municipal ordinances regulating the rate of speed of trains, and requiring certain signals to be displayed on moving trains at night, within the limits of the municipality, apply to the private switch yards of a railroad company, situated within those limits.[2]

In Tennessee the Supreme Court rules that a railroad crossing a highway, and having built a bridge over its tracks, is bound to restore the bridge if it is destroyed or becomes unsafe. Its acquittal on an indictment for failing to repair it is no bar to a bill by the county for a mandatory injunction requiring the company to maintain the bridge, and to repay the county the expense of rebuilding it. Where the county replaces the bridge with one suitable for the purpose of public travel, and substantially the same as the former one, it can recover its cost of the company, though the bridge is not exactly the same structure as the company itself would have erected.[3]

A statute of Missouri of 1847 gave to the defendant company all the privileges and immunities which were granted to the L. & C. R. Co. by Acts 1836-37, which provides, *inter alia*, that "the stock of said company shall be exempt from state and county taxes." A statute of 1852, granting lands to defendant, and accepted by it, provides that it shall "pay into the treasury of the state a sum of money equal to the amount of state tax on other real and personal property of like value for that year, upon the actual value of the road-bed . . . and other property of said company," etc. The Supreme Court holds that this act in no way affects defendant's charter exemption from taxation forcounty purposes.[4]

A statute of Nebraska provides that the officers of a railroad company shall list and return to the auditor of public accounts for assessment the property of the company, including the roadbed, right of way and superstructures thereon, depot buildings and personal property necessary for the construction, repairs, or successful operation of the road, but that all machine and repair shops, and all real and personal property outside of said right of way and depot grounds shall be listed with the local assessor. The Suprme Court rules that land not used as a part of the roadbed or right of way, though purchased in anticipation that some time in the future it might be necessary for tracks, etc., should be assessed by the local assessor. But a roundhouse, unless used as a repair shop, should not.[5]

In Pennsylvania, the plaintiff sued the P. railroad for negligently causing her husband's death. The accident occurred in the yard at M., on the line of the N. road, and it was contended by plaintiff that defendant operated the latter road. The trains were composed of cars and engines of both roads, used indiscriminately. The employes wore defendant's *insignia*, and those whose negligence was complained of belonged to a relief association to which none but the employés of the "P. system" were eligible. Defendant's agents sold tickets over the N. line as if it was under their control, and, in pamphlets and maps issued by defendant, the N. line was treated as part of its main line or under its control. Defendant's freight department gave directions to the agents on the part of this line on which the accident occurred, with reference to the management of freight. The N. line crossed a river at M., and the bridge had been destroyed five years before the accident, and never rebuilt; after which the southern end was leased, and used as a division of defendant's line, and the hands paid by defendant's car. The engines in the roundhouse at M. were marked as defendant's engines, but had the N.'s tenders attached. The officers of the two roads were the

same persons. The Supreme Court thinks this sufficient to warrant the jury in finding that defendant operated the road.[6]

In New York the Supreme Court rules that the statute of 1888 prohibiting any steam railroad doing business in the state of New York from heating its passenger cars by any stove or furnaces kept inside the car or suspended therefrom, but providing that the act shall not apply to railroads less than 50 miles in length, applies to a railroad of the prescribed length, which is partly within and partly without the state, though the portion within the state is less than 50 miles in length.[7]

Carriage of Goods and Injuries to Property.

In Tennessee the Supreme Court rules that if a railroad lawfully located upon a city street, by its charter and municipal consent, uses the street in the operation of its road, beyond what is necessary for the proper running of its trains, and by such successive and improper use substantially destroys the easement of way and of ingress and egress appurtenant to an abutting lot, the owner of such lot can maintain successive actions for such nuisance, recovering the damages that have accrued up to the time each action was brought; and a recovery in one action will not bar a subsequent one, brought for a continuance of such wrongs. The measure of damages in such cases is the impairment of the value of the use of such property by such nuisance during its continuance. The difference in the market value of the property cannot be considered.[8]

In New York the Supreme Court holds that in an action against elevated railroad companies for damages to adjoining property caused by its construction and operation, the element of noise may be considered in awarding damages.[9]

In Kansas it is held by the Supreme Court that where a railroad company has constructed a "Y" in a public street of a city, without authority from the city council, so close to the sidewalk that it practically prevents access from the abutting lots to the streets, the owner of the abutting lots so constructed can recover damages.[10]

In Georgia the Supreme Court holds that where the killing of stock by a locomotive is fully explained by the uncontradicted testimony of the engineer that the accident occurred at night, in a fog so dense as to prevent the animals being seen in time to save by the exercise of every precaution, the presumption of negligence arising from the fact of killing is rebutted, and a verdict for plaintiff should be set aside.[11]

In South Carolina the Supreme Court rules that in an action against a railroad company for negligently killing a cow, where it appears that the general stock law was in force at the place, it is error to refuse to charge that in such case defendant is not required to use the same care and caution as in localities where such law is not in force.[12]

In Arkansas the Supreme Court decides that a municipal ordinance, which is afterward validated by act of the legislature, granting the right of way along a certain street, the fee to which is in adjoining owners, to a railroad company, and under which the latter constructs its roadbed upon the street, is no defense to an action for the land brought by adjoining landowners against the railroad company, as such use of the street is not within the scope of the public easement therein. But where the landowners have never objected to the ordinance, which was passed more than three years before the commencement of the action, and have allowed the railroad company to construct its tracks, depots, etc., and operate its road, without objection, they must be held to have acquiesced therein, and are estopped to maintain ejectment.[13]

In Indiana, the Supreme Court rules that one who permits his cattle to wander unattended in the highway in the vicinity of a railroad crossing is guilty of contributory negligence, and cannot recover, if they are negligently killed by a passing train. The fact that the cattle were at large in the highway by permission of the township authorities does not affect the rule as to the owner's negligence.[14]

In Kansas, the Supreme Court holds that where the premises appropriated for the right of way by a railroad company are a part of a homestead occupied by the husband and wife as a residence, and the title thereof is in the wife, both husband and wife may join in an appeal from the award of the commissioners, and upon the trial of the appeal in the district court both are joint parties, and have a joint interest in the action.[15]

Injuries to Passengers, Employes and Strangers.

In Minnesota, the defendant, a depot company, was organized for the purpose of furnishing depot and station-house accommodations at the city of St. Paul for the use of such railroads as enter into contract with it; it leased a room in its depot building to a tenant, who therein carried on the business of storing parcels for travelers. Plaintiff arrived at the depot by rail, as a passenger, and proceeded to the room for the purpose of temporarily storing his valise, and was there willfully and maliciously assaulted and beaten by an employé of defendant's tenant. This employé was a man of savage and vicious propensities, who had frequently, during the six years of his employment there, attacked and beaten persons lawfully upon the premises, and this was well known to defendant corporation on the day of the attack upon the plaintiff. The Supreme Court holds the company liable.[16]

In New York the plaintiff, while attempting to board a train, struck her foot against the side of the car platform, which was some inches higher than the station platform, causing her serious injury. She testified that the space was covered by the dress of a lady passenger, who was entering the car just ahead of her, so that she did not see it. She was a frequent passenger on the road, and always used the station where the injury occurred. She did not look to see where she placed her foot. A space of from two to six inches or more between the car and station platform is essential in operating a road, and it was shown to be impossible to have the platform on exactly the same level, owing to the difference in the car springs. Similar accidents had occurred on defendant's road at other stations. At one station a movable platform was used, but it was not adapted to the station in question. The Supreme Court holds that she did not use ordinary care, and the railroad is not liable.[17]

In the same state it appears that the plaintiff, on alighting from the car, and while closely pressed in front and behind by other passengers, stepped into an open space between the car and the station platform, and that similar accidents had occurred at other similar stations on defendant's road. The Supreme Court holds the company liable.[18]

In the Federal Court it is ruled that where an employé knows of the hazardous character of the work which he undertakes, and is injured by an accident which could not be foreseen by his employer, the latter is not liable in damages.[19]

In Michigan the plaintiff had worked for a year in a car shop, and had seen a grindstone trimmed by others, and had been shown by the foreman how to trim it. He had worked on it once himself, and also for several minutes the morning when hurt. The iron bar which he held against the stone caught in it and was turned down, and his hand was crushed between the bar and the stone. The Supreme Court holds that as the danger must have been as apparent to him as to one of more experience, and he could have avoided the danger by letting go of the bar when it caught, he must be considered to have assumed the risk, and cannot recover.[20]

In New York in an action against an elevated railroad the plaintiff testified that, while walking along the street over which the road was operated, a piece of hot coal, smaller than a pin-head, was thrown from the locomotive, and fell in plaintiff's eye, causing the injury complained of. There was no evidence that more than this one coal was thrown from the locomotive on this occasion, or that sparks were emitted from it or other locomotives on other occasions. The Court of Appeals rules that the evidence was not sufficient to warrant an inference by the jury that the defendant was guilty of actionable negligence.[21]

In a case in the United States Circuit Court a woman left a house where she lived, and went 40 or 50 rods, to where there was a fire set by defendant's locomotive. In attempting to extinguish the fire she was fatally burned. The house where she lived was not then in danger, nor did she have any interest in the property which was on fire. The Court holds that the proximate cause of her injury was her own voluntary act, and there can be no recovery.[22]

1 B. R. Co. v. M. & W. R. Co., 17 Atl. Rep., 923.
2 Grube v. Mo. Pac. R. Co., 11 S. W. Rep., 736.
3 C., O. & S. W. R. Co. v. Dyer Co., 11 S. W. Rep., 943.
4 State v. H. & S. J. R. Co., 11 S. W. Rep., 746.
5 Red Willow Co. v. C., B. & Q. R. Co., 42 N. W. Rep., 879.
6 Penn. R. Co. v. Sellers, 17 Atl. Rep., 987.
7 People v. N. Y., N. H. & H. R. Co., 5 N. Y. Supp., 945.
8 Harman v. L., N. O. & T. R. Co., 11 S. W. Rep., 703.
9 Kane v. M. E. R. Co., 6 N. Y. Supp., 526.
10 K. N. & D. R. Co. v. McAfee, 21 Pac. Rep., 1,057.
11 G., M. & G. R. Co. v. Harris, 9 S. E. Rep., 786.
12 Harley v. E. R. Co., 9 S. E. Rep., 782.
13 Reichert vs. St. L. & S. F. R. Co., 11 S. W. Rep., 696.
14 Hanna v. T. H. & I. R. Co., 21 N. E. Rep., 903.
15 C. K. & W. R. Co. v. Anderson, 21 Pac. Rep., 1059.
16 Dean v. St. Paul U. D. Co., 43 N. W. Rep., 54.
17 Hanrahan v. Manhattan R. Co., 6 N. Y. Supp., 375.
18 Brady v. Manhattan R. Co., 6 N. Y. Supp., 533.
19 Easton v. H. & T. C. R. Co., 39 Fed. Rep., 65.
20 Melzer v Penn. Car Co., 42 N. W. Rep., 1078.
21 Weidmer v. N. Y. El. R. Co., 21 N. E. Rep., 1,041.
22 Pike v. Grand Trunk R. Co., 39 Fed. Rep., 255.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Chicago, St. Paul, Minneapolis & Omaha, 2 per cent. on the preferred stock, payable Jan. 20, and 1½ per cent. on the common stock, payable Jan. 2.

Cincinnati, Hamilton & Dayton, 1¼ per cent., payable Jan. 30.

Denver & Rio Grande, 1¼ per cent. on the preferred stock, payable Feb. 20.

Illinois Central, semi-annual, 3 per cent., payable March 1.

Lake Erie & Western, quarterly, 1 per cent. on the preferred stock, payable Feb. 14.

Mahoning Coal, semi-annual, 2½ per cent., payable Feb. 1.

Sandusky, Mansfield & Newark, 3½ per cent.

Wheeling & Lake Erie, quarterly, 1 per cent. on the preferred stock, payable Feb. 14.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Atlantic & Western, annual, Jacksonville, Fla., Feb. 4.

Denver, Texas & Fort Worth, special, Denver, Col., Feb. 20, to act upon a proposed consolidation with the Union Pacific system in Colorado.

Guelph Junction, annual, Guelph, Ont., Feb. 4.

Illinois Central, annual, Chicago, Ill., March 12.

Indianapolis, Decatur & Western, special, Indianapolis, Ind., Jan. 30.

Keokuk & Western, annual, Keokuk, Ia., Feb. 5.

Little Miami, annual, Cincinnati, O., Jan 28.

Maskinonge & Nipissing, special, Montreal, P. Que., Jan. 30, to authorize a proposed issue of bonds.

Ontario, Carbondale & Scranton, annual, 119 Wyoming avenue, Scranton, Pa., Jan. 29.

St. Catherines & Niagara Central, annual, St. Catherines, Ont., Jan. 27.

Western Counties, annual, Yarmouth, Nova Scotia, Feb. 12.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Illinois Society of Engineers and Surveyors* will hold its next annual meeting at Peoria, Ill., Jan 29.

The *International Association of Ticket Agents* will hold its next semi-annual meeting at the Hotel St. James, Jacksonville, Fla., Feb. 11.

The *Master Car Builders' Association* will hold its next annual convention at Old Point Comfort, Va. Rooms should be secured of Mr. F. N. Pike, manager, Hygeia Hotel, Fortress Monroe, Va.

The *New England Railroad Club* meets at its rooms in the United States Hotel, Beach street, Boston, on the second Wednesday of each month, except June, July and August.

The *Western Railway Club* holds regular meetings on the third Tuesday in each month, except June, July and August, at its rooms in the Phenix Building, Jackson street, Chicago, at 2 p. m.

The *New York Railroad Club* meets at its rooms, 113 Liberty street, New York City, at 7:30 p. m., on the third Thursday in each month.

The *Central Railway Club* meets at the Tift House, Buffalo, the fourth Wednesday of January, March, May, August and October.

The *Northwest Railroad Club* meets on the first Saturday of each month in the St. Paul Union Station at 7:30 p. m.

The *American Society of Civil Engineers* holds its regular meeting on the first and third Wednesday in each month, at the House of the Society, 127 East Twenty-third street, New York.

The *Boston Society of Civil Engineers* holds its regular meetings at Boston, at 7:30 p. m., on the third Wednesday in each month. The next meeting will be held at the American House.

The *Western Society of Engineers* holds its regular meetings at its hall, No. 67 Washington street, Chicago, at 7:30 p. m., on the first Tuesday in each month.

The *Engineers' Club of St. Louis* holds regular meetings in St. Louis on the first and third Wednesdays in each month.

The *Engineers' Club of Philadelphia* holds regular meetings at the house of the Club, 1,122 Girard street, Philadelphia.

The *Engineers' Society of Western Pennsylvania* holds regular meetings on the third Tuesday in each month, at 7:30 p. m., at its rooms in the Penn Building, Pittsburgh, Pa.

The *Engineers' Club of Cincinnati* holds its regular meetings at 8 p. m. on the third Thursday of each month at the Club rooms, No. 24 West Fourth street, Cincinnati.

The *Civil Engineers' Club of Cleveland* holds regular meetings on the second Tuesday of each month, at 8:00 p. m., in the Case Library Building, Cleveland. Semi-monthly meetings are held on the Fourth Tuesday of the month.

The *Engineers' Club of Kansas City* meets at Kansas City, Mo., on the first Monday in each month.

The *Civil Engineers' Society of St. Paul* meets at St. Paul, Minn., on the first Monday in each month.

The *Montana Society of Civil Engineers* meets at Helena, Mont., at 7:30 p. m., on the third Saturday in each month.

The *Civil Engineers' Club of Kansas* holds regular meetings on the first Wednesday in each month at Wichita, Kan.

Civil Engineers' Club of Cleveland.

A regular monthly meeting was held Jan. 14, Mr. A. H. Porter in the chair, in the absence of the President and Vice-President. Messrs. Sidney H. Short, Fred E. Bright and L. E. Holden were elected to active membership. The President appointed two committees on nomination. Mr. A. Mordecai presented a paper on the Harbor Facilities of Cleveland for Handling Coal and Ore, and introduced Mr. Edward Lindsey, who showed a model of a machine for unloading coal cars by inverting them. This was followed by a paper by Mr. J. H. Seargent, entitled, "A Belt Line Railway and the Improvements of the Lake Front."

Engineers' Club of Philadelphia.

The twelfth annual meeting was held Jan. 11, 1890, President William Sellers in the chair; 51 members and one visitor present.

The retiring President, Mr. William Sellers, delivered the annual address, which was devoted to the proper limitations of manual training schools and the character of instruction which should be given therein; also to the conditions necessary for permanently good highways and the practicability of attaining them, with a form of procedure that would accomplish the result without taxing the municipality.

The Secretary and Treasurer presented his annual report, showing the club to be in good financial condition. The membership embraced two honorary, 481 active and 16 associate members.

The following were elected officers for 1890: President, Prof. H. W. Spangler; Vice-President, Wilfred Lewis; Secretary and Treasurer, Howard Murphy. Directors: John T. Boyd, George Burnham, Jr., E. V. d'Invilliers, Henry G. Morris, S. M. Prevost.

Prof. H. W. Spangler took the chair for 1890. He expressed earnest wishes for the welfare of the club, and particularly urged that we should all endeavor to harmoniously assist each other in promoting its interests and prosperity.

International Association of Ticket Agents.

The semi-annual convention of this organization will be held at Hotel St. James, Jacksonville, Fla., Feb. 11. Arrangements have been made for a trip through Florida, and thence to New Orleans, affording the excursionists an opportunity to witness the sights of the Mardi Gras. Those who return home by way of Cincinnati will stop over a day at Mammoth Cave. A special train of parlor and sleeping cars will start from Cincinnati Feb. 9. The Pennsylvania, the "Big Four," the Queen & Crescent, the East Tennessee, Virginia & Georgia, the Louisville & Nashville, the Florida Central & Peninsular, the Central of Georgia, the Charleston & Savannah, the Western & Atlantic, the Brunswick & Western, and many other roads, have extended invitations to ticket agents and their families all over the country to use their lines in going to the convention. All ticket agents are invited to attend the convention, and join in the excursions, whether members of the association or not. M. G. Carrel, 81 Beech street, Cleveland, O., is secretary.

Montana Society of Civil Engineers.

A regular monthly meeting was held Dec. 21 at the office of Mr. Beckler, Chief Engineer Montana Central, President Greene in the chair. A committee was appointed to make arrangements for the annual meeting. Names for officers for the ensuing year were submitted by the nominating committee.

A special meeting was held Jan. 11 to take suitable action in respect to the death of General B. H. Greene, President of the society. A committee of three was appointed to prepare a memorial, to report at next meeting. The committee appointed consisted of Mr. J. S. Keerl, Colonel W. W. de Lacy and Mr. W. A. Haven. The committee on the annual meeting was instructed to give up all preparation for any sort of festivities on that occasion.

New England Railroad Club.

At the next regular meeting, Feb. 12, the subject discussed will be that of the form of guarantee and contract for chilled wheels. It will be remembered that the excellent forms recommended by the M. C. B. committee at the last convention were barely adopted on the letter ballot.

PERSONAL.

—Mr. Walter Gresham has resigned as General Manager of the Galveston & Western.

—Mr. A. L. Alexander, Resident Engineer of the Inter-Oceanic road, in the City of Mexico, has resigned.

—Mr. Charles F. Adams, President of the Union Pacific, started this week for Cuba on a three weeks' trip.

—Mr. George C. Magoun, Chairman of the Board of Directors of the Atchison, Topeka & Santa Fe, will soon sail for a short stay in England.

—Mr. F. M. Leader has been appointed General Manager of the Bloomsburg & Sullivan road, of which he has been Superintendent since September, 1887.

—Mr. Morton Mills, who had been connected with the West Jersey road in various capacities for nearly 25 years, part of the time as Freight Agent, died in Bridgeton, N. J., Jan. 10, aged 75 years.

—Mr. R. C. Simons, who for the past two years has been office engineer for the Denver & Rio Grande, has recently resigned that position and opened an office at Room 28, Barclay building, Denver, Col., as a civil and consulting engineer.

—Mr. George Butler, whose death was referred to last week, had held the position of Assistant Secretary and Assistant Treasurer of the St. Louis & San Francisco since the lease of the Atlantic & Pacific. He had been Treasurer of the latter road for several years before the lease was made.

—Mr. Charles H. Holdridge, General Passenger and Ticket Agent of the Minneapolis & St. Louis, has resigned to accept the position of Assistant General Passenger Agent in St. Paul of the Chicago, St. Paul & Kansas City, vice Mr. E. P. Capen, resigned. Mr. Charles Pratt will succeed Mr. Holdridge as General Passenger and Ticket Agent of the Minneapolis & St. Louis.

—Col. Ethelbert L. Dudley, General Manager of the St. Paul & Duluth, died in St. Paul, Minn., Jan. 15. He was stricken with laryngeal paralysis a week ago and gradually grew worse, the disease developing into apoplexy. Col. Dudley was born in Danville, Ky., Jan. 16, 1845. He was with the St. Louis, Iron Mountain & Southern from 1870 to 1882, with the Texas & Pacific as Superintendent and as General Manager. In 1886 he became General Manager of the Central Iowa, and in 1888 General Manager of the St. Paul & Duluth.

ELECTIONS AND APPOINTMENTS.

Anderson, Lebanon & St. Louis.—Benjamin Crane, of Crawfordsville, Ind., has been appointed Receiver by the Circuit Court of Montgomery County, Ind.

Baltimore & Harrisburg, Western Division.—At a meeting of the stockholders of the extension at Gettysburg, Pa., on Jan. 14, they elected Hon. David Wills President, and O. C. Musselman, Andrew Marshall, William F. Benchoff, John A. Livers, J. Emory Bair and Col. C. H. Buehler, members of the Board of Directors.

Bradford, Eldred & Cuba.—The following directors were elected at a meeting of stockholders held Jan. 15: Frank M. Baker, Oswego, N. Y.; Hon. Thomas C. Platt, Frank H. Platt, August Stein, Theo. F. Wood, W. E. Mantins, P. F. Bellinger, W. C. Sheldon, Jr., H. L. Leroy, B. W. Spencer, C. L. Atterbury, all of New York; E. N. Dickerson, W. S. Bissell, Buffalo. The directors elected these officers: President, Frank H. Platt; Vice-President, August Stein; Secretary, Theodore F. Wood, and Treasurer, B. W. Spencer.

Buffalo & Williamsville.—The annual meeting of the road was held at Buffalo last week. The following directors were chosen: James Tillinghast, B. J. Tillman, J. S. Buell, George Urban, Charles Berrick, Fred D. Stow, E. S. Turner, T. M. Johnson, Ensign Bennett, E. H. Witter, C. C. Pickering, A. H. Roudebush and N. P. Stanton.

Burlington & Missouri River.—George H. Crosby has been appointed General Freight Agent of the road, with headquarters at Omaha, in place of Thomas Miller, who will assume the position of General Freight Agent of the Chicago, Burlington & Quincy Feb. 1.

Canadian Atlantic.—This company has been organized n London, Eng., by the following Board of Directors: Sir Henry Isaacs, Sir Robert N. Fowler, Thomas Wood, C. E. Mott, W. R. Balch, all of London, and E. P. Bender, Quebec.

Central of Georgia.—E. F. Cunningham has been appointed Assistant Comptroller of the road, with office at Savannah.

Capt. J. C. Haskell has been appointed Purchasing Agent of the road, vice W. H. Price, resigned, with headquarters in Savannah.

Charleston, Cincinnati & Chicago.—W. P. Harris has been appointed Superintendent of the Northern Division, with headquarters at Johnson City, Tenn.

Chesapeake & Ohio.—T. S. Lloyd has been appointed Master Mechanic of the Cincinnati Division, with headquarters at Covington, Ky., the appointment taking effect Feb. 1.

Chicago, St. Paul & Kansas City.—C. H. Holdridge has been appointed General Agent Passenger Department of this company, with office at 195 East Third street, St. Paul, Minn., vice E. P. Capen, resigned. Mr. Holdridge will have immediate supervision of the passenger business of the company in St. Paul and Minneapolis.

Cincinnati, Saginaw & Mackinaw.—F. W. Salsbury has been appointed General Freight Agent of this company, with headquarters at East Saginaw, Mich.

F. W. Salsbury, who has been Traveling Freight Agent on the Duluth, South Shore & Atlantic, has been appointed General Freight Agent of this road, with headquarters at East Saginaw, Mich.

Cleveland & Canton.—The office of General Freight and Passenger Agent, heretofore filled by Albert Rokusek, has been divided. H. R. Moore, Contracting Agent of the Lake Shore & Michigan Southern at Cleveland, has been appointed General Freight Agent. Mr. Rokusek will continue as General Passenger Agent.

Denver, Texas & Fort Worth.—H. A. Johnson has been appointed General Freight Agent, with headquarters at Denver, vice W. V. Newlin, appointed General Freight and Passenger Agent of the Texas Panhandle route in Texas, with headquarters at Fort Worth, vice J. L. A. Thomas, transferred. F. I. Smith has been appointed General Agent of this company, with headquarters at Denver, Col., office at corner of Seventeenth and Larimer streets. The offices of General Agent at San Francisco, Cal., and Salt Lake, Utah, and Assistant General Agent at Portland, Ore., and Los Angeles, Cal., have been abolished. Communications heretofore addressed to these respective agencies should be addressed to the traffic officers of the Union Pacific at the points mentioned, who will hereafter represent this company at these points.

Galveston & Western.—At a meeting of the Directors, held at Galveston, Tex., last week, J. C. League, President, resigned. Julius Runge was elected President. George Seeligson was elected a Director, to succeed J. C. League. The following are now the officers and directors: President, Julius Runge; Vice-President, J. E. Wallis; Treasurer, W. L. Moody. Directors: Frank Lee, A. M. Shannon, B. Adoue, Walter Gresham, T. C. Thompson, George Seeligson. Executive Committee: Julius Runge, J. C. Wallace and W. L. Moody.

Georgia, Carolina & Northern.—The annual meeting was held in Athens, Tenn., Jan. 15. The old directors were elected, except that R. S. Lucke succeeds R. E. McLure, deceased. The offices will be removed to Athens, Ga., Feb. 1.

Goodyear, Neillsville & Northern.—Hugh Blair has been appointed Superintendent, with office at Goodyear, Wis.

Gulf & Northwestern.—The officers of this company are: G. Bedell Moore, President; D. Call, Vice-President; W. H. Stark, Secretary, and W. S. Davidson, Treasurer. The office is at Orange, Tex.

Jacksonville, Louisville & St. Louis.—The incorporators of this Illinois company are: Isaac L. Morrison, David W. Rider, W. W. Kent, William S. Hook and Marcus Hook, of Jacksonville, who are officers of the Jacksonville Southeastern. The first Board of Directors is as follows: J. Henry Dunn, of Germantown, Pa.; William Elliott, of Chestnut Hill, Pa., and J. L. Morrison, William S. Hook and Marcus Hook, of Jacksonville.

Lancaster & Hamden.—The annual meeting was held in Lancaster, O., recently, and the following Board of Directors and officers were elected: President, John G. Reeves; Vice-President, Theodore Mithoff; Secretary, Benjamin F. Dunn; Treasurer, Philip Rising; Directors, James H. Ballard, William H. Mowery, John F. Ogier, William B. Maccracken, J. H. Axline, P. W. Bininger and Thomas O. R. Tarpey.

London & Port Stanley.—The annual meeting of the shareholders was held at London, Ont., last week. The following directors were elected: Sir Joseph Hickson, Montreal; Charles Stiff and Joseph Hobson, Hamilton; James Egan, G. S. Birrell, W. J. Reid, John McClarry, R. Pritchard, T. S. Hobbs and Mayors Taylor and Morse, of London and St. Thomas. At a subsequent meeting of the directors Mr. James Egan was re-elected President and Mayor Morse, Vice-President.

Louisville & Nashville.—Fred D. Bush, recently appointed Division Passenger Agent, with headquarters in Montgomery, has declined the appointment and returned to Atlanta as District Passenger Agent.

Lower Laurentian.—The following are the officers: James McNaught, St. Paul, Minn., President; Robert Kiernan, Three Rivers, P. Que., Vice-President; W. A. Williams, New York City, Secretary and Treasurer; C. A. Scott, Contractor and Manager, and James Cadman, Engineer in Charge. The office is at 105 Mountain Hill, Quebec.

Mississippi Railroad Commission.—The Legislature has elected the following commissioners: Walter McLaurin and J. F. Sessions of the old board, and James H. Asken, to succeed Mr. Kyle.

Missouri Pacific.—J. C. Lincoln has been appointed Assistant General Freight Agent of the road, with office at St. Louis, to succeed W. C. Stith, resigned.

Missouri River, North Platte & Denver.—The stockholders of the company met in Albion, Neb., recently and elected the following directors: Loran Clark, F. M. Sackett, S. S. Hadley, B. C. Hall, T. C. Patterson, T. J. Foley, B. I. Hinman. The officers are: Loran Clark, President; T. C. Patterson, Vice-President; T. J. Foley, Treasurer; F. H. Smith, Secretary.

Mobile & Ohio.—At the meeting of the general mortgage bondholders of the company, at No. 11 Pine street, New York, the following board of directors was elected: A. Iselin, Jr., A. H. Stevens, J. C. Clarke, F. D. Tappen, E. L. Russell, H. B. Plant, Sidney Shepard, James H. Fay, W. J. Hearin, R. K. Dow, T. G. Bush, John Paton and W. Butler Duncan.

Mt. Pleasant & Broad Ford.—At its annual meeting last week the company elected as directors: J. B. Washington, Pittsburgh, President; A. R. Banning, Connellsville, Pa.; John Bissell, J. P. Jackson, W. C. Magee, J. B. Meeds, J. D. Patton, S. L. Schoonmaker, Pittsburgh, Pa.; C. L. Fitzhugh, Allegheny; Robert Garrett, Alexander Shaw, C. F. Mayer, Baltimore, Ind., O. P. Shupe, Mt. Pleasant, Pa.; Secretary and Treasurer, A. W. Black, Pittsburgh.

New York & New England.—George F. Randolph has been appointed General Freight Agent, with office in Boston, to succeed Joseph A. Shinn, resigned.

Norfolk Belt Line.—The corporators of this Virginia company are: G. M. Serpell, H. Walters, Charles G. Elliott, John T. Griffin and Warren G. Elliott.

Ohio Valley.—James P. Montgomery has been appointed General Superintendent, with office at Evansville, Ind., to succeed W. P. Hegeman. Mr. Montgomery resigned this position last August, when he was succeeded by Mr. Hegeman.

Omaha & Republican Valley.—The annual meeting of the company was held recently in Omaha. The old board of directors was re-elected, as follows: Charles Francis Adams, Edwin F. Atkins, Fred L. Ames, J. Gordon Dexter, John Spaulding, Sidney Dillon and H.W. Holcomb.

Pennsylvania, Poughkeepsie & Boston.—W. W. Gibbs, of Philadelphia, Vice-President of the company, has been elected President to succeed Gen. James W. Husted, of Peekskill, N. Y., resigned.

Pittsburgh & Northern.—The following directors were elected at the annual meeting last week: President, Henry W. Oliver; Directors, J. W. Chalfant, C. H. Caster, A. J. Thomas, J. P. Kerk, Lewellyn Thomas, H. D. Campbell, and James D. Callery.

Plymouth & Middleboro.—The following are named as incorporators of this Massachusetts company: Nathaniel Morton, William R. Drew, Gideon F. Holmes, Roswell S. Douglass, Jason W. Mixter, Increase Robinson, Charles O. Churchill, William P. Stoddard, John H. Parks, Francis F. Emery, Benjamin A. Hathaway, Thomas D. Shumway, of Plymouth; Eugene P. LeBaron, George L. Soule, Albert T. Savery, of Middleboro; Theron M. Cole, George F. Morse, of Carver.

Ponchartrain.—At the annual meeting of the board of directors of the road the following officers were elected: C. Marshall, President; A. J. Jacobs, Secretary. The new board of directors are: C. Marshall, J. F. Murdy, J. V. Ross, J. E. Eaves, Joseph Denegre and G. L. Travis.

Potomac Valley.—The incorporators of this Maryland company are: Charles W. Humrichouse, John M. Hood, Levi Wineberger, Robert Biggs, F. F. McComas, James Findlay and Victor Cushwa.

St. Louis Transfer.—The annual meeting of the stockholders of the company was held last week at St. Louis, and the following directors were elected: John Scullin, W. D. Griswold, R. P. Tansey, S. H. Klinger, Charles L. Dean and J. M. Thompson, all of St. Louis, and D. D. Gray, of Columbus, O.

Sandusky, Mansfield & Newark.—At a meeting in Sandusky, O., Jan. 17, of the stockholders of the road, the following directors were elected: Robert Garrett, Charles S. Mayer, Baltimore; John Gardiner, E. D. Gardiner, Norwalk; L. J. Tracy, Mansfield, O.; J. O. Moss, A. C. Moss, C. H. Moss, Clark Rude, Sandusky. Officers elected were: John Gardiner, President; J. O. Moss, Secretary and Treasurer. The company renewed the lease of the Newark, Somerset & Straitsville road for a term of forty years.

Silver Lake.—J. Lansing Moore, Superintendent of the road, has resigned, and has been succeeded by H. T. Gould, Assistant Superintendent, with office at Rochester, N. Y.

Southern Kansas of Texas.—G. N. Kent has been elected Vice-President to succeed A. A. Robinson, resigned, and C. B. Strohn has been elected General Freight and Passenger Agent. The offices are now at Panhandle, Tex.

Stewartstown.—At the annual meeting of the stockholders of this road, held at Stewartstown, Pa., Jan. 13, the following board of directors was elected: President, James Fulton; Directors, Andrew Anderson, Andrew Leib, M. W. Bahn, John S. Leib, J. Schall Wilhelm, John B. Gemmill, John Wiley, Joseph W. Anderson, James C. Jordan and M. Schall.

Superior Belt Line.—The incorporators are: Frank A. Flower, Franklin G. Wilson, John Mather, Frank A. Ross and Howard J. Campbell, of Superior, and James B. Thayer, of River Falls, Wis.

Tacoma & Puyallup.—The officers are: R. F. Radebaugh, President; Frank O. Meeker, Vice-President and Treasurer, and G. W. McAllister, Secretary, all of Tacoma, Wash.

Terminal Railroad Association of St. Louis.—Frank Stillwell, Acting Superintendent, has been appointed Superintendent, and will have charge of the transportation department and the superintendency of all other departments. H. P. Taussig, Resident Engineer, has been appointed Chief Engineer and Assistant to the President. James Hanna has been appointed Auditor, in addition to his duties as Secretary and Assistant Treasurer.

Terre Haute & Peoria.—The stockholders of the company have elected two directors for a term of two years. C. O. Chestnut, of Paris, Ill., and J. W. Bunn, of Springfield, were chosen. I. H. Burgoor, General Manager, was elected to succeed G. W. Beale, of Chicago, resigned. C. W. Fairbanks, of Indianapolis, was re-elected President, and F. A. Richmond, of Indianapolis, was elected Secretary.

Toledo, Kedallville & Rochester.—The principal stockholders of this new Indiana road are George H. Teney, A. Hays and N. Parker, of Boston; R. Teney, Hanover, N. H., and G. Wiswell, of Cincinnati.

Tonawanda Valley & Cuba.—The following directors were elected at the annual meeting held Jan. 15: Hon. Thomas C. Platt, Frank H. Platt, August Stein, Theodore F. Wood, W. E. Mantins, P. F. Bellinger, B. W. Spencer, R. B. Ferris, S. R. Stone, O. S. Carter, H. A. Oakley and C. L. Atterbury, of New York. These officers were elected: President, P. F. Bellinger; Vice-President, August Stein; Secretary, Theodore F. Wood, and Treasurer, B. W. Spencer.

Union Depot Co. (Kansas City).—The annual meeting the directors of the company was held in Kansas City, Mo., Jan. 14. The directors were elected as follows: George H. Nettleton, President; W. J. Terry, Secretary; C. C. Ripley, Treasurer; E. G. Fish, Superintendent; A. W. Millspaugh, Ticket Agent; F. E. Nettleton, Baggage Master. The Executive Committee is composed of George H. Nettleton, W. F. Merrill and A. A. Robinson.

Union Pacific.—C. F. Meek has been appointed Assistant General Manager of the Colorado Division, with office at Denver, reporting to the General Manager of the Missouri River Division. Mr. Meek still continues as General Manager of the Denver, Texas & Fort Worth.

The office of Chief Engineer of the Oregon Railway & Navigation Co. has been abolished, and W. H. Kennedy has been appointed Principal Assistant Engineer of the Union Pacific, with headquarters at Portland, Ore. He will have charge of construction work of the Pacific Division, reporting direct to the Chief Engineer. T. Appleton has been appointed Engineer of Buildings, with headquarters at Omaha, Neb., with charge of the preparation of plans for, and construction of, special buildings and structures, and important yards, also the preparation of standard plans for structures, reporting direct to the Chief Engineer. H. C. Relf has been appointed Resident Engineer in the construction department at Cheyenne, Wyo., to succeed R. H. Huntley, transferred to Omaha.

Utah Midland.—The Company elected the following directors at the recent annual meeting: W. S. McCornick, O. J. Saulsbury, G. S. Erb, F. Auerbach, C. E. Noble, J. J. Hagerman, of Colorado Springs, and Henry T. Rogers, of Denver,

Valley (Ohio).—Thomas M. King, Vice-President of the Baltimore & Ohio, has been elected President to succeed J. H. Wade, resigned. W. S. Jones, Andrew and C. D. L'Huillier, Directors, have resigned, and Thomas M. King, Hon. William McKinley, Jr., of Canton, and M. R. Dickey, of Cleveland, have been elected to succeed them.

Western New York & Pennsylvania.—At a meeting of the board of directors of the road, held Jan. 15, the following officers were elected: President, Calvin H. Allen; Vice-President, Samuel G. De Coursey; Treasurer, F. S. Buell; Secretary, J. R. Trimble; Auditor, William L. Doyle. William Mertens was elected a director.

White & Black River Valley.—The directors of the consolidated company are: R. W. Martin and W. J. Thompson, of Little Rock; V. H. Henderson, Searcy; James P. Coffin, Powhatan; W. L. McDonald, Newport; James T. Henderson, Auvergne; James B. Dent, Riverside; E. G. Thompson, Augusta, and Minor Gregory, of Gregory, Ark. R. W. Martin is President and W. J. Thompson General Manager.

Wilkesbarre & Western.—The annual meeting of the stockholders of the company was held in the Girard

Building, Philadelphia, Jan. 15. The following were elected directors: Hon. Joseph M. Gazzam, Philadelphia, President; F. W. Kennedy, Morris Liveright, John B. Stetson, Charles D. Barney, W. C. DeArmond, John M. Sharp and Max Bamberger, all of Philadelphia; Charles Raht, of New York City.

Wrightsville & Tennille.—The stockholders of the road held their annual meeting at Tennille, Ga., Jan. 13. The following were elected directors: W. B. Thomas, J. W. Smith, Tennille; A. F. Daley, Wrightsville; R. L. Warthen, Sandersville; O. H. Rogers and Charles Hicks, Dublin; Edward McIntyre, Savannah; J. S. Wood and G. W. Perkins, Tennille. The board of directors elected W. B. Thomas President and Superintendent; W. C. Mathews, Secretary and Treasurer.

OLD AND NEW ROADS.

Anderson, Lebanon & St. Louis.—A receiver has been appointed for this company, which in 1876 built 19 miles of road between Anderson and Nobleville, Ind., which is now operated as part of the Midland road.

Augusta & West Florida.—Ground was broken Jan. 20 on the line, at a point eight miles south of Augusta, Ga. The road will extend through the pine belt of South Georgia to Thomasville, a distance of 230 miles, connecting there with the projected line through Tallahassee to the Gulf coast. C. E. Smith, 3 Warren Block, Augusta, is President of the railroad company, and Jesse Thompson, of Augusta, is President of the construction company.

Baltimore & Drum Point.—The County Commissioners of Anne Arundel County, Md., at a meeting held at Annapolis, Jan. 21, voted $200,000 six-per cent. county bonds to the capital stock of this company. The county of Calvert had previously made a subscription of $100,000 of six per cent. bonds, and the state of Maryland $153,000, which has been paid in cash. This will enable the company to prosecute its work with rapidity. Arrangements will be made immediately for beginning tracklaying, the cross-ties having been delivered during the autumn and winter months. It is in contemplation to extend the line to the north side of the Potomac River, in St. Mary's County, to connect by ferry with the proposed Richmond & Chesapeake, which has power to consolidate with the Baltimore & Drum Point. The councils of the city of Richmond some time ago granted a franchise to the Richmond & Chesapeake, authorizing it to construct a tunnel from the Union Depot, on the south side of the city, on a direct line to the north side of the city, thereby making connection between all the roads entering the city on the south side and those entering on the north side. The construction of this tunnel is now in progress, and the long northern approach to it has been excavated. It will be completed during the present year, and the whole line from Richmond to the Potomac will probably be ready for business at the same time. This new road, in connection with the Baltimore & Drum Point, will give the Baltimore & Ohio a line to Richmond and connections with all Southern railroads terminating at that point. Oliver W. Barnes, 57 Broadway, New York City, is Engineer of the two roads.

Baltimore & Eastern Shore.—The contract for grading the terminal of the road on the west side of Chesapeake Bay, where the connection with the Annapolis & Baltimore Short Line is made, has been let to a Mr. Bryan, of the Fifth District of Anne Arundel County. The work between Easton and Salisbury, Md., is rapidly progressing, and if the weather continues mild the road will be completed to Salisbury before the summer excursion season begins.

Baltimore & Ohio.—The company is making a preliminary survey for a road from McKeesport to Jeannette, Pa., a distance of about 15 miles. The survey is up Crooked Run from McKeesport, thence by tunnel to Long Run, and thence to Jeannette.

Batesville & Brinkley.—The name of this road was changed to the White & Black River Valley, at a meeting of the stockholders at Newport, Ark., Jan. 10.

Birmingham & Tennessee River.—Incorporated in Alabama to build a road from Birmingham northwest through Blountsville to Guntersville on the Tennessee River, about 70 miles. James F. Douglass, James and I. Conway and others are incorporators.

Cache River Valley.—C. T. Collins, Odd Fellows' Hall Building, St. Louis, Mo., has the contract for building this road in northern Arkansas, which is being constructed along the Cache River from Shotwells, on the Kansas City, Fort Scott & Gulf, 13 miles west of Jonesboro, Ark. Richard Jackson, Gainesville, Ark., is interested.

Canadian Roads.—In addition to the companies previously referred to as applying to the Dominion Parliament for acts of incorporation or amendments to existing charters, the following companies are seeking legislation in Canada for that purpose: For incorporation, the Alberta Colonization, Brandon & Southwestern, Cape Breton Island, Columbia River, Hamilton Junction, Mount Forrest & Mayford, Nelson & Pend d'Oreille, Owen Sound & Lake Huron, Portage la Prairie & Duck Mountain, Port Burwell & Woodstock and the Shore Line. The companies who are asking for amendments to existing charters are: Georgian Bay, Lake Erie, Great Northwest Central, Hereford, Montreal & Western, Manitoba & Northwestern, Manitoba Railway & Canal Co., Ontario Pacific, Saskatchewan Railway & Mining Co., and Victoria & Sault Ste. Marie Junction.

Chattanooga & Western.—The Chattanooga Coal, Iron & Railroad Co. has had surveys made for this road, which is to extend from Chattanooga, crossing the Tennessee near the Roane Iron Works, and thence northeast along the river, to Hill City. From Hill City it is proposed to continue the line north to Walden's Ridge, at a point not yet decided upon.

Cheyenne & Northern.—A party of 12 engineers began the survey last week from Wendover, Wyo., to Fisher, on the Tremont, Elkhorn & Missouri Valley, about 28 miles. It is announced that Kilpatrick Bros. & Collins will begin grading when the survey is finished.

Chicago, Kansas & Nebraska.—The Chicago, Rock Island & Pacific and the Chicago, Kansas & Nebraska have filed their cross bills in the mortgage foreclosure case of this road, which is being opposed by the counties in Kansas which took the stock of the company in payment of the bonds they issued to secure the building of the road. The two answers comprise a general denial of the charges made by the municipal alliance, denying that either of the companies has attempted to defraud the people of the counties in Kansas through which the road was built.

Cleveland & Canton.—A new survey will be made next week for the extension of the Chagrin Falls branch from Solon to Chagrin Falls, O. Three routes for the extension have been surveyed.

Columbus Southern.—Tracklaying has been nearly finished to Dawson, Ga. Trains are running regularly to Richland, 39 miles from Columbus, and tracklaying has been finished beyond Weston, a station 11 miles from Richland. Six hundred men are working on the road and over a mile is being finished each day.

East Portland & Oregon City.—Incorporated in Oregon to build a road from East Portland through Oregon City to Barlow Station, on the Oregon & California. The capital is $500,000.

Fairmount Valley.—This Tennessee company has just received a charter in Tennessee to build a road from a point on the state line in Polk County, Tenn., northeast toward Knoxville.

Florida Southern.—The company has agreed to build an extension from Leesburg, Fla., or a point near there, across Sumter County to Lake Panasoffkee, and to the Withlocoochee River, if it is voted $20,000 by the residents along the route.

Fort Madison & Northwestern.—The road was sold for the second time, in Chancery, at Fort Madison, Ia., Jan. 16, to C. A. Gilchrist, the present receiver, for $27,900. The first sale, on Oct. 29 last, to the Fort Madison, Birmingham & Western for $37,900 was set aside by Judge Love because the bid was too low. Since then four attempts have been made to sell the road without success until the last.

Fort Worth Belt.—Hurley, Tierney & Lynch, of Fort Worth, Tex., are the contractors on this road, which is being built around Fort Worth, Tex., by the projectors of the Fort Worth & Albuquerque. The line is seven miles long, and of this about a mile has been graded.

French Broad Valley.—The company has extended the time for receiving proposals for building the first 30 miles of the road from Jan. 21 to Feb. 1.

Georgia Pacific.—Some months ago the contract for the construction of 40 miles of the road, from Itabena, Miss., toward Helena, Ark., was awarded, and ten miles of the track have been laid. The line has been surveyed to Jonestown, within 14 miles of Helena, and engineers are now locating the line into Helena.

Georgia Southern & Florida.—Work on the extension from Tipton to Thomasville, Ga., 52 miles, will probably begin next month. The location has not yet been completed, nor has all the right-of-way been secured. As soon as these matters are settled construction work will be started. As stated last week, Morgan & Reynolds, of Macon, Ga., have the contract for grading. The maximum grades on the line are 52.8 ft. per mile, and the maximum curves are four degrees. The country is gently rolling, with dense forests of long leaf yellow pine. The bonds on the line will be issued through the Mercantile Trust Co. of Baltimore. W. Henry Wells, of Macon, is Chief Engineer.

Great Northern.—It is expected that all of the arrangements for the transfer of the lines comprising the St. Paul, Minneapolis & Manitoba system will be completed by Feb. 1, and a circular announcing the fact, together with all changes that will be made necessary, will probably be issued on that date.

Gulf & Northwestern.—A charter was recently granted in Texas to this company, which proposes to build a road from Orange northward through the counties of Orange, Newton and Jasper. Orange is on the Southern Pacific, 106 miles east of Houston, and on the Sabine River a short distance from its outlet into the Gulf through Sabine Pass. The road will pass through the lumber manufacturing district of southeast Texas and southwest Louisiana, the principal timber being long leaf yellow pine. G. Bedell Moore, of Orange, is President.

Illinois Central.—The following report shows the earnings and expenses of the road for the six months ending Dec. 31 (December, 1889, estimated).

	1889.	1888.	Inc.
Miles	2,275	1,953	322
Gross earnings	$7,745,031	$5,370,833	$1,374,198
Oper. expen. and taxes	4,484,577	3,943,201	541,376
Perm. imp. paid from inc.	163,657	155,992	7,665
Total	$4,648,234	$4,099,193	$549,041
Net earnings	3,096,847	2,271,690	825,157

The Dubuque & Sioux City reports its gross and net earnings for the six months ending Dec. 31, as follows:

	D. & S. C.		Cedar Falls & Minn.	
	1889	1888	1889	1888
Miles	524	524	76	76
Gross earn.	$1,033,642	$974,340	$52,630	$52,200
Oper. expen. and taxes	710,101	754,686	82,223	60,072
Net earnings	$323,541	$219,654	Def. $29,603	Def. $7,872

	Both Roads		
	1889	1888	Inc. or dec.
Miles	600	600	.....
Gross earn.	$1,086,262	$1,026,540	Inc. $59,722
Oper. exp. and taxes	792,324	814,758	Dec. 22,434
Net earnings	$293,938	$211,782	Inc. $82,156

The Dubuque & Sioux City has also expended on permanent improvements $97,124 which has been charged to capital account. The amount so spent and charged in 1888 was $93,513.

Indiana & Lake Michigan.—The line will probably be put in operation, about Feb. 15, between South Bend, Ind., and St. Joseph, Mich., a distance of 40 miles. The surfacing has been partially done, and the tracklaying, including sidings, has been finished. The road will be operated by the Terre Haute & Indianapolis as a part of its Terre Haute & Logansport division of the Vandalia Line, making the line from Terre Haute, Ind., to St. Joseph, Mich., 223 miles in length. The line will probably be operated under a lease, but this matter has not been definitely decided.

Jacksonville, St. Louis & Louisville.—The Jacksonville Southeastern has been reorganized, and the above company was chartered Jan. 18 to operate that part of the line between Jacksonville and Centralia, Ill., 112 miles. The capital stock of the new company is $1,500,000.

Kentucky Legislature.—Bills have been introduced in the Kentucky Legislature to incorporate the following companies: Burkesville & North Western, Carter County, and Kinniconnick & Freestone railroad companies, and also to provide for the building and maintaining of bridges on county roads in Campbell County. The legislature will be asked to grant a charter for a road from Owensboro southwest through Calhoun to Madisonville, a distance of about 35 miles.

Lake Erie, Essex & Detroit River.—This company has deposited in the office of the Secretary of State at Ottawa a mortgage deed made between the company and the Trusts Corporation of Ontario as Trustees to secure the payment of an issue of $760,000 debentures issued by the company.

Lake Manitoba Railway & Canal Co.—This company is applying to the Dominion Parliament for an act to construct a line from a point on the road already chartered northwesterly to Lake Winnipegosis, near Meadow Portage, Man.

Louisville, New Albany & Chicago.—The company is reported to have under consideration a proposed branch from Bennettsville, Ind., 12 miles north of New Albany, to Jeffersonville. The road will be about 14 miles long, and but little grading will be needed. Only one bridge, across Silver Creek, will be required. The object is to reach the cement trade at Sellersburg, Cementville and other points in Clark County, Ind. Nothing definite has been decided concerning the extension, and if it is built at all it will not be for some time. The survey for the line has not yet been made.

Louisville & Southeastern.—This is the name of a company which proposes to build a narrow gauge road from Louisville southeast to Mount Washington in Bullitt County, Ky., about 18 miles. The incorporators are: George Swearingen, Dennis Long, J. B. Camp and W. B. Hoke, of Louisville.

Lower Laurentian.—This company is to receive a subsidy of $96,000 from the Dominion Government on the line from the crossing of the St. Maurice River at Grande Mere, down the west bank of that river to Three Rivers station, about 30 miles. Tracklaying will begin about May 1 on the northern section, between St. Tite Junction and Riviere a Pierre station, on the Quebec & Lake St. John. The distance between Three Rivers and Riviere a Pierre is 70 miles. Twenty miles of the northern section is already completed, and 200 men are engaged in cutting timber for the line and getting out stone for the masonry. The maximum grades are 80 ft. to the mile. There are two iron bridges, 300 ft. and 500 ft. long respectively. The contracts for rolling stock will be let next month. C. A. Scott, 105 Mountain Hill, Quebec, is contractor and manager.

Mahoning Coal.—The stockholders of the company have decided to lease the Mahoning & Shenango, the Shenango Valley and the Stewart roads. The directors have been authorized to use the unissued common stock and as much of the preferred stock as was necessary to pay the rental, and to lease the three lines to the Lake Shore & Michigan Southern.

Mason County Central.—A six-mile extension is being built from Puget Sound to Gray's Harbor, Wash. The work is not difficult. The maximum grades are two per cent. and the maximum curves are eight degrees. About 100 men are working on the extension under the direction of the officers of the company. William Kneeland, Shelton, Wash., is Chief Engineer.

Mexican Pacific.—Nearly 1,000 men are reported at work on this line, on the section between Tonalá and San Cristóbal Las Casas. This portion of the road will, it is expected, be completed by the close of the year.

Mexican Roads.—A concession has been granted to Benigno V. Garcia for a road from the port of Guaymas to the coal lands in the districts of Ures, Hermosillo, Guaymas and Alamos, State of Sonora. Construction must begin within two years and be completed within seven. No subvention is given.

The Department of Public Works has granted a concession for a narrow gauge road from San Juan de los Llanos through Santa Lugarda, Coyuaco, Zacapoaxtla and Tlatlauqui to Tezuitlan. San Juan is on the Interoceanic. The concessionaires are Gen. Hermenegildo Carillo & Co. Construction must begin within a year, the line to be completed in five years. A subsidy of $6,000 per kilometre is granted, to be paid in five per cent. bonds.

A concession has been granted Gen. Felipe Berriozábal and Sebastian Camacho to build a standard gauge road from Tula, on the Mexican Central, to Zacualtipan, passing through the cities of Pachuca and Tulancingo in the State of Hidalgo, with power to extend the line to Tampico or Túxpam. The usual privileges regarding free importation of material are granted; also a subvention of $8,000 per kilometre, payable in five per cent. bonds.

Mexican Southern.—The grading on the first section from Pueblo south to Tehuacan, a distance of 78 miles, has been nearly all finished. Hampson & Stanhope, who had a large sub-contract on this section, have removed their forces to Tecomava, where there is heavy work to be done.

Middlesborough Belt.—Several miles of grading has been completed south of Middlesborough, Ky., and a large force has commenced work north of the town, near the crossing of the Louisville & Nashville. Stevens & Scanlan, of Fort Payne, Ala., have a sub contract for grading three miles of the line east of the Louisville & Nashville to Cumberland avenue. The preliminary survey for a branch of the road up Bennett's Fork has been completed, and the construction will commence soon. This branch will be six miles long, and will open communication with several coal deposits.

Missouri, Tennessee & Georgia.—E. P. Buell & Co., of Tarlton, O., have the contract for building and equipping this line from Humboldt, Tenn., to Hickman, Ky. They will let sub contracts about March 1, and grading will then commence. The route is west from Humboldt, Tenn., to Newbern, and then north along the Mississippi River through Tiptonville, Tenn., to Hickman, Ky., about 90 miles. Extensions from Hickman and Humboldt are also proposed. The work is generally very light, with a one per cent grade. For 17 miles near Hickman the work will be very heavy, as it will consist of levee work, reclaiming many hundreds of acres of fertile farming and cotton land. E. P. Buell & Co. receive in payment for their work the first mortgage bonds and part of the stock of the company, and also such county and township bonds as may be voted. The bonds are said to have been placed in Europe. C. H. Ferrell, Humboldt, is Vice-President and General Manager, and John B. Inman is Chief Engineer.

Montgomery Belt.—Most of the tracklaying on this belt line at Montgomery, Ala., has been finished and connections made with the various lines entering the city. As soon as the rolling stock arrives the road will be opened for traffic.

Napanee, Tamworth & Quebec.—This company is applying to Parliament for power to extend its line westerly to the Sault Ste. Marie with a branch to Sudbury, also for power to build a branch to iron mines in the counties of Leeds, Hastings, Peterboro, and in Nipissing Districts, also for power to change the name of the company.

Niagara Bridge & Canandaigua.—Notice of the surrender of the stock of the company to the New York Central & Hudson River road was filed with the Secretary of State at Albany, N. Y., last week. The road is 98 miles long, and extends from Canandaigua to Niagara Bridge, and has been leased to the Central for the entire term of its charter.

Norfolk Belt Line.—This company has a bill before the Virginia State Legislature for articles of incorporation to build a road from a point on the Norfolk & Carolina, east of Suffolk, through the counties of Nansemond and Norfolk, and across the southern and eastern branches of the Elizabeth River to the city of Norfolk; and to construct piers, wharves, and dock at Norfolk.

Norfolk & Western.—That part of the Flat Top extension of the Clinch Valley division, from Tazewell C. H., Va., to Honaker, has been opened for traffic. The distance from the Clinch Valley junction to Honaker is 54 miles, and from Bluefield, Va., to that point, 57 miles.

Northern Central.—The work of double tracking the road between York, Pa., and Harrisburg, Pa., 28 miles, is progressing rapidly.

Ohio & Big Sandy.—J. C. Thomas is in charge of a survey which is being made for the proposed extension from Richardson, Ky., southeast toward the Breaks of the Sandy at the Cumberland Mountains.

Oley Valley.—This is a short projected road to extend from Reading, Pa., through the Oley Valley, Berks County, for some miles. In the same interest the Wyomissing road is projected from Reading to Mohrsville, Pa., five miles. George Brooke, of Birdsboro, Pa., is President.

Orange & Keysville.—Gamble & Granville, of East Saginaw, Mich., who, as already stated, have the contracts for grading this road between Orange, C. H., and Keysville, Va., 90 miles, have forces working from Arvon station, or Arvonia P. O., south, 11 miles, and from Farmville, south, six miles. About 100 teams and 200 men are being employed on the work. Grading will commence on the balance of the line when it has been located. Thomas Moore, 912 East Main street, Richmond, Va., is Chief Engineer.

Pennsylvania.—The company is reported to have secured control of the French Creek road, building from near Phœnixville, Pa., to the mines near French Creek, with the intention of continuing construction in the direction of Lancaster.

Philadelphia & Reading.—The work of widening the tunnels at West Manayunk and at Phœnixville, Pa., on the main line is about completed. The widening was begun about a year ago. The progress has been necessarily slow, on account of the hardness of the rock, and because the contractors were allowed to use but 25 per cent. of dynamite in blasting. The work was also hampered by the fact that, during its whole progress, trains have been run regularly through the tunnels. One track only was used by trains, the workmen occupying the other. One side of each tunnel was widened before the other was begun. The tunnel at Phœnixville is 1,932 ft. long, and that at West Manayunk about half that length. The bridge at the north end of the Phœnixville tunnel, over the Schuylkill River, was also widened. The company decided that the widening of the tunnel below Port Clinton was unnecessary, as it was used only by the north-bound trains, the south-bound trains making a detour, crossing the river by two bridges, one above and one below the tunnel. R. A. Malone & Son were the contractors.

Work was commenced this week on the Northeast Pennsylvania extension from Hartville via Centreville to New Hope, Pa. The road is to be completed by Aug. 1. The new line will be 16 miles long and will be laid with 70-pound rails.

Philadelphia & Reading Terminal.—Mayor Fitler, of Philadelphia, has signed the ordinance which passed City Councils several days ago, granting the right to the company to construct an elevated road through the city to Arch street. The railroad company desired to reach Market street, one block further south than Arch street, and the original bill in Councils was so worded; but, on its passage, an amendment was adopted, providing that the road should terminate at Arch street. It is the general belief that the company will refuse to accept the bill, and that further efforts will be made to obtain the right to build the road to Market street. An ordinance, supplemental to the one signed by the mayor, has been introduced in Select Council, authorizing the company to extend the road from Arch street to Market street. It was referred to the Railroad Committee.

Phillips & Rangeley Lake.—The contract for constructing the line will probably be let in a few weeks. It is to extend from Phillips to Rangeley, Me., 28 miles. The engineers are now working out the estimates. The road is to be 2 ft. gauge.

Pittsburgh, Fort Wayne & Chicago.—F. Gwinner, of Allegheny, Pa., has the contract for double tracking the road between Allegheny and Conway, Pa., 23 miles. Gangs of men are working at Jack's Run, Emsworth, Dixmont, Rochester and Conway. The heaviest part of the work is between Emsworth and Dixmont, where considerable rock will have to be removed.

Point Pleasant & Northwestern.—A survey for this line will be commenced at Tarlton in a short time, and continued northwesterly. There has been five miles of the road completed between Vinton station and Vinton Furnace. The line has been surveyed from Vinton station through McArthur to Bloomingville, where it connects with the survey of the Lancaster & Hamden, which it follows north to Tarlton and the junction with the Cincinnati & Muskingum Valley road. Beyond these points two routes are under consideration. One line is from Tarlton west to Circleville, and thence northwest to Marysville, Union County, O. The other line is northwest via Ashville and Commercial Point to Marysville. E. P. Buell & Co., of Tarlton, O., are the projectors.

Port Arthur, Duluth & Winnipeg.—This company is applying to Parliament for power to construct a branch from Sand Lake, northwest to Lake Kaogaskok, and to Sabawe Lake, Ont.

Portland & Oregon City.—Incorporated in Oregon to build a road from East Portland through Sellwood and Milwaukee to Oregon City. The capital stock is $200,000.

This company has been incorporated in Oregon to build a road from Portland through Sellwood and Milwaukee to Oregon City. The capital stock is $200,000.

Portland & Willamette Falls.—This company has been chartered in Oregon to build a road from Portland through Oswego to Oregon City. The capital stock is $500,000.

Potomac Valley.—This company has been organized to build a road from a connection with the main line of the Western Maryland, near Williamsport, Md., to a connection with the Baltimore & Ohio road at a point between North Mountain and Cherry Run station, in Franklin County. The capital stock is fixed at $50,000. J. M. Hood, of Baltimore, and others connected with the Western Maryland are incorporators.

Richmond & Allegheny.—At a meeting of the stockholders and directors of the Richmond & Allegheny and the Chesapeake & Ohio, held in Richmond, Va., Jan. 20, the sale of the Richmond & Allegheny to the Chesapeake & Ohio was completed; the execution of all the necessary papers was authorized, and the final delivery of the property was made. The bill of the Virginia Legislature authorizing the consolidation was accepted. The deed of conveyance has been recorded, the consideration being $6,000,000 in first mortgage consolidated bonds of the Chesapeake & Ohio, $1,000,000 second mortgage bonds, 10,000 shares of preferred and 60,000 shares of common stock. The new bonds of the Chesapeake & Ohio will be ready for distribution in about a month.

St. Louis, Arkansas & Texas.—A committee consisting of Frederic P. Olcott, Henry Budge, James Speyer, John Kennedy Tod and Edmund Smith, has formed a plan for the reorganization of the road. It provides for the issue of $20,000,000 first-mortgage four per cent. bonds, $8,000,000 second-mortgage bonds at the same rate of interest, and $20,000,000 preferred stock, entitled to five per cent. dividends, non-cumulative, and $16,500,000 common stock. An assessment of $10 a share is laid on the present stock, and from this and a part of the new securities it is proposed to spend about $2,000,000 in improvements and $1,400,000 in retiring existing car trust certificates.

St. Louis, Iron Mountain & Southern.—The company has formally filed resolutions at Little Rock, Ark., providing for an extension of the line from near Gurdon, in Clark County, though the counties of Pike, Montgomery, Polk and Scott to Fort Smith, and to build a branch making a continuous line from Gurdon to Fort Smith.

St. Louis & San Francisco.—The earnings and expenses for November, 1888 and 1889, were as follows:

	1889	1888	Inc. or dec.
Miles operate	1,329	1,329	.....
Gross earnings	$508,798	$546,075	$22,723
Operating expenses	228,267	302,519	14,252
Net earnings	$280,531	$243,556	$36,975
Imp'ts and taxes	19,852	57,853	38,001
Net revenue from traffic	$260,679	$185,703	$74,976

San Pete Valley.—The Utah & Arizona extension from Chester south to Manti, Utah, 17 miles, is now graded, and tracklaying will begin in the spring.

Savannah, Americus & Montgomery.—A large force is now at work changing the gauge of 27 miles of the western division of the line, from Abbeville to Louvale, Ga., six miles east of the Chattahoochee River, to standard. From Abbeville west the gauge has already been changed to standard.

Sioux City & Northern.—The track was laid to Division street in Sioux City, Ia., Jan. 13. The stations and sidings are all completed, except in Sioux City. Regular trains will probably be put on Feb. 1 between Sioux City and Garretson, S. D., 96 miles. Connection is made at the latter place with the St. Paul & Minneapolis, in connection with which it will be operated.

Superior Belt Line.—This company proposes to build a belt line at Superior, Wis., from St. Louis Bay around the city and Alouez Bay, and thence back to a point on St. Louis Bay near where the line commences.

Texas, Topolobampo & Pacific.—The concession of this company has been officially declared forfeited. The concession was originally granted in June, 1881, and favorably modified in 1882 and 1886, and, finally, in 1888, the company being obliged within a year from the last modification to build at least 30 miles of road, which has not been done. The company loses the forfeit money, $90,000, deposited in the National Monte de Piedad.

Texas Western.—In the case of the Farmers' Loan and Trust Co., against this company Judge Don A. Pardee has filed a formal order in the United States Court at Galveston, relieving the property of the receivership and turning it over to the purchaser, Elijah Smith, who assumes the costs.

Toledo, Kendallville & Rochester.—The company has filed its articles of incorporation in Indiana. The road is projected to extend from Kendallville through Noble, Kosciusko and Fulton counties southwest to Rochester on the Chicago & Atlantic and the Lake Erie & Western. The capital stock is $1,500,000.

Union Pacific.—The annual report of the government directors pronounces the general condition of the company and the financial results of the past year satisfactory. It recommends the passage of the Outhwaite bill as giving a basis for the settlement of the company's debt to the government, the security insured to the government by the provisions of the bill being in the opinion of the directors entirely adequate. The road's physical condition is pronounced satisfactory, and the directors express their entire confidence in the ability, honesty and purposes of the present managers of the company. It is hoped, the report says, that Congress will by legislation supplement the attempts of these managers to rescue the Union Pacific system from insolvency and place it upon a sound financial basis.

Vaudreuil & Prescott.—The company has made application to the Dominion government for a subsidy for 40 miles of road for which no subsidy has yet been granted. It will amount to about $128,000. The company will also apply to the Ontario government for a subsidy for that part of the road within the province of Ontario, about 80 miles.

White & Black River Valley.—The Batesville & Brinkley, operating a road between Batesville and Jacksonport, Ark., 60 miles, has been consolidated with this road, as well as the Augusta & Southwestern, referred to last week. The authorized capital stock of the company was increased to $15,000 per mile, and bonds are to be issued to the amount of $15,000 per mile on the road now completed, and on the proposed extension from Jacksonport. The issue will amount to $2,850,000.

TRAFFIC.

Traffic Notes.

A company has been organized at Pittsburgh to build a storehouse near the Pennsylvania Railroad to cost $100,000. It is said that this is a result of the enforcement of demurrage charges.

The Chicago, Rock Island & Pacific will not reduce its rates from Kansas City, its local traffic from points in Missouri and Iowa being too valuable to sacrifice. The Chicago, St. Paul & Kansas City will also maintain the old rate.

The dullness in the coal trade produced by the mild weather has caused a serious blockade of cars on the Philadelphia & Reading. Eleven thousand cars, all loaded, are side tracked between the mines and Philadelphia.

The Central New England & Western announces that it will run through passenger trains between Hartford and Philadelphia, via the Lehigh & Hudson, the Pennsylvania and the Central of New Jersey. The time will be eleven hours.

The Pennsylvania was compelled last week to give notice that it could not receive freight at Pittsburgh for the East, on account of the illness of trainmen. On one division over one-half the conductors were off duty at one time, most of them being prostrated by the prevailing influenza.

The Western Freight Association has had numerous conferences concerning live stock rates from the Missouri river to Chicago, which have been reduced by the Chicago & Alton. The 12½ cent rate made by the Alton from Kansas City will be applied by the Atchison at St. Joseph, but the rates from Omaha and other points are to be maintained at 25 cents.

The Trunk lines and Central Traffic Association have issued a complete sheet of passenger rates from Chicago and St. Louis eastward, showing the differential rates to all points by the weaker lines. This tariff is to be used as a basing sheet by the roads west of the cities named, a privilege which has been denied them heretofore. It is expected that this action will put a stop to much of the commission paying heretofore prevalent. The Western roads demand that in return for this abolition of commissions the Trunk lines be less dictatorial in the matter of westbound emigrant business.

The Chicago, Burlington & Northern has put in effect a second class fare of $4 from St. Paul to Chicago, and its action has been followed by the Wisconsin Central, the Chicago, Milwaukee & St. Paul, and the Chicago, St. Paul & Kansas City. The Atchison, Topeka & Santa Fe announces that it will sell tickets from Kansas City to Indianapolis, via Chicago, at the same rates as by the direct routes. West bound rates between Chicago and St. Paul are now $9 first class, and $7 second class. The Boston roads have given notice that they will use these figures in making through rates, this being necessary to meet Soo line competition; but the Trunk lines have not approved such action.

Anthracite Coal Tonnage.

The following is the statement of anthracite coal production for the month of December, 1889, as compared with the same period last year, as compiled from returns furnished by the mine operators:

	Dec. 1889.	Dec. 1888.	Inc. or Dec.
From Wyoming region	1,392,630	1,524,579	D. 132,549
From Lehigh region	482,664	519,175	D. 36,510
From Schuylkill region	861,041	660,169	I. 200,871
Total	2,735,735	2,763,923	I. 31,811

	Year. 1889.	Year. 1888.	Inc. or Dec.
From Wyoming region	18,647,925	21,852,366	D. 3,204,440
From Lehigh region	6,285,421	5,639,236	I. 646,184
From Schuylkill region	10,474,364	10,654,116	D. 179,752
Total	35,407,710	38,145,718	D. 2,738,008

The stock of coal on hand at tide-water shipping points, Dec. 31, 1889, was 1,026,107 tons, on Nov. 30, 771,334 tons; an increase of 254,773 tons. The amount on hand Dec. 31, 1888, was 652,156 tons. Of the total production in 1889, 52.67 per cent. from the Wyoming Region; 17.75 per cent. from Lehigh Region, and 29.58 per cent. from Schuylkill Region. The Eastern competitive tonnage, including all coal which for final consumption or in transit, reaches any point on the Hudson River or the Bay of New York, or which passes out of the Capes of the Delaware, was 13,657,604 tons, in 1888, and 12,217,862 tons in 1889.

East-bound Shipments.

The shipments of east-bound freight from Chicago by all lines for the week ending Saturday, Jan. 18, amounted to 128,096 tons, against 131,793 tons during the preceding week, a decrease of 3,697 tons, and against 61,846 tons during the corresponding week of 1889, an increase of 69,947 tons. The proportions carried by each road were:

	W'k to Jan. 18. Tons.	W'k to Jan. 18. P. c.	W'k to Jan. 11. Tons.	W'k to Jan. 11. P. c.
Michigan Central	17,755	13.8	22,490	17.1
Wabash	6,258	4.9	4,680	3.5
Lake Shore & Michigan South.	20,784	16.2	25,161	19.1
Pitts., Ft. Wayne & Chicago	12,521	9.8	12,529	9.5
Chicago, St. Louis & Pitts.	11,046	8.6	10,650	8.1
Baltimore & Ohio	15,458	12.1	14,786	11.2
Chicago & Grand Trunk	16,413	12.8	18,839	14.3
New York, Chic. & St. Louis	10,512	8.2	12,295	9.3
Chicago & Atlantic	17,399	13.6	10,363	7.9
Total	128,096	100.0	131,793	100.0

Of the above shipments 8,747 tons were flour, 84,164 tons grain, 2,693 tons millstuffs, 6,947 tons cured meats, 4,960 tons lard, 8,882 tons dressed beef, 928 tons butter, 1,375 tons hides, 184 tons wool and 4,009 tons lumber. The three Vanderbilt lines together carried 38.2 per cent. of all the shipments, while the Pennsylvania lines carried 18.4 per cent.